AN ABSTRACT OF THE THESIS OF

Colleen M. Kinney for the degree of Master of Arts in Interdisciplinary Studies in Political Science, Geosciences, and Anthropology presented on June 8, 1995. Title: New Directions in Disaster Planning: A Case Study of Community-Based Emergency Preparedness in Benton County, Oregon.

Abstract approved: _____
Sally Davenport

Major disasters are taking an ever-increasing toll on American communities. To cope with this growing problem, Benton County is seeking to adopt an alternative approach known as Community-Based Emergency Preparedness. Its goal is to improve collaboration among governmental agencies and the public to gain greater flexibility in decision-making and implementation. Increased community participation is intended to produce not only improved emergency readiness, but also preparations in the home, school, and workplace to reduce the effects of disaster when it strikes.

This case study describes strategies Benton County officials have used to involve citizens in planning and preparing for disasters during a twelve-month period from April, 1994 to April, 1995. A recently formed citizen-initiated community coalition meets regularly to organize public education forums and emergency exercises. This is different from the past, when disaster planning was undertaken only by professionals and specialists who tended to leave the public out of the process. Public, private, and volunteer groups at the community level are now seeking to create a dynamic disaster planning process that reflects community values and

accountability. Included in this case study is the development of digital maps of multiple hazards to aid experts in communicating risks to the public. Disaster planning is complicated because the community and the experts perceive risks differently. To facilitate the program in a systematic fashion, six process characteristics have been identified. Because this approach is new, the process of disaster planning is still under development.

NEW DIRECTIONS IN DISASTER PLANNING: A CASE STUDY OF COMMUNITY-BASED EMERGENCY PREPAREDNESS IN BENTON COUNTY, OREGON

by

Colleen M. Kinney

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Arts in Interdisciplinary Studies

Completed June 8, 1995
Commencement June 1996

Master of Arts in Interdisciplinary Studies thesis of Colleen M. Kinney presented on June 8, 1995

APPROVED:

Redacted for Privacy

Major Professor, representing Political Science

Redacted for Privacy

Professor, representing Geosciences

Redacted for Privacy

Professor, representing Anthropology

Redacted for Privacy

Chair of Department of Political Science

Redacted for Privacy

Dean of Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Redacted for Privacy

Colleen M. Kinney, Author

ACKNOWLEDGMENTS

I would like to thank my committee for helping me all the way to the end: Sally Davenport, Leonard Friedman, Robert Lawrence, Charles Rosenfeld, and John Young. I appreciate the support of OSU's Geosciences students, staff, and faculty, including Doug Oetter, Jill Saligoe-Simmel, Courtney Armentrout, Hillary Egna, and Chris Oliver. Thanks to Sam Zelman, who read numerous revisions.

Kudos to all those who serve the public in emergency management: at Benton County, including Jim Swinyard, RJ Zimmer, Howard Harris, Mike Jacquith, Claire Keith, Dick Ragsdale, and Donna Gregerson; at Oregon Emergency Management, especially Ian Finseth and Kellie Jo Jensen; at FEMA Region X, Greg Polt; and the American Red Cross. Also, hats off to Diane Merten and other citizen activist extraordinaires who work towards disaster preparedness at the community level.

Many thanks to friends and mentors at Mills, including Sydney Lindauer, Fred Lawson, Karen Koshak, the Hum family, Ashley Moran, and Heather Brown; colleagues at the *Statesman Journal*; Barbara Allred, Katie Spring; Annie Shigeta; global traveling companion, Susan Lindauer, and her father, Eric Lindauer; my dad, and brothers, Daniel, Stephen, and Michael and their families.

This accomplishment would not be possible without continued support of my mother. I appreciate her endless motivation and support as we both close this chapter of our graduate school careers. Way to go, Dr. Mom!

Lastly, to my soulmate Mario Hess, who also went through a rigorous master's program (and survived), thank you for sharing your energy with me. With the warmth of the Monkeytree Haus Family, we are closer to our bright future together in Germany!

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (CONTINUED)

APPENDICES

LIST OF PLATES

Plate

1. Benton County Snow and Ice Priority Plan (Benton County Public Works, 1993)

2. Locations of Hazardous Materials Sites and Routes and Radiological Sites in Corvallis (Oregon State Fire Marshal's Handbook on Hazardous Materials, 1993; Oregon State Health Division, 1994)

3. Geology of Benton County (Oregon Department of Geology and Minerals Industries, 1979)

4. Fire Risk Map of Benton County (Oregon Department of Forestry, 1991)

5. Floodplain Map (Federal Emergency Management Agency, Flood Insurance Study of Benton Co., 1986)

6. Benton County Utility Designation Zoning (Benton County Public Works, 1994)

NEW DIRECTIONS IN DISASTER PLANNING: A CASE STUDY OF COMMUNITY-BASED EMERGENCY PREPAREDNESS IN BENTON COUNTY, OREGON

CHAPTER 1
INTRODUCTION

There has been a dramatic increase worldwide in casualties and property losses due to natural disasters in recent years (Rosenfeld, 1993: 5). "The damage has increased three-fold from the 1960s through the 1980s, leaving more than 3 million dead ... and 800 million displaced" (ibid.). Geographers Burton, Kates and White (1993) link the rise in deaths and destruction in disasters worldwide to three principal factors: increase in population; movement of population to hazardous areas; and advances in the technology of recording disaster events (pp. 24-28). Rosenfeld (1994) cites population increase as key: "As the population of the Earth has doubled from three billion of 1960, the annual losses due to disaster has grown almost ten-fold" (p. 1).

In the United States, the trend is similar. A 1994 Congressional report concluded: "The cost of disasters, to the nation and to federal taxpayers, is on the rise. Since 1989, there have been nine natural disasters in the U.S. that caused losses in excess of $1 billion each" (U.S. House of Representatives, December 14, 1994: 7). This is the greatest total loss in any comparable period in American history.

Spatial distribution of population is a second trend that magnifies disaster losses. Burton, Kates and White (1993) wrote: "In virtually all countries, the predominant movement of the past half-

century has been from farm to town or city" (p. 25). For example, in heavily populated and industrialized Tokyo, a combined earthquake, fire and tsunami may one day take a heavier toll of lives than if people had remained in their rural communities (ibid.). Thus, more people are more vulnerable to risk in hazardous, densely populated regions.

Changing Definition of a Hazard

The definition of a hazard has changed as well. Smith (1992) defines a hazard as a "potential threat to humans and their welfare" and risk as the "probability of hazard occurrence" (p. 6). A disaster may be seen as "the realization of hazard" (ibid.). Disasters include not only natural events, such as earthquakes, floods, tsunamis, lightning, landslides, volcanic eruptions, hurricanes, cyclones, tornadoes, blizzards, forest fires, hailstorms and heat waves, but increasingly as human-induced or technological events, like massive civil strife, hazardous waste emissions, oil spills, nuclear reactor melt-downs, possible global warming, and water and air pollution. Disaster characteristics vary in terms of speed of onset, warning time, intensity, predictability, scope of impact, extent of destruction (Dynes, 1970: 431). Table 1 lists potentially hazardous environmental agents and examples.

Need for Better Planning

Policymakers are grappling with the problem of growing disaster losses. Recent disasters have demonstrated that governmental agencies have failed to curb disaster losses, thus pointing out the

Table 1: Potentially Hazardous Environmental Agents and Examples

Type of Agent	Examples
Atmospheric	• Rain • Freezing rain ("glaze") • Hail • Snow • Wind • Lightning • Temperature ("heat wave" or "cold spell", frost) • Thunderstorms • Tornadoes • Hurricanes • Blizzards • Drought
Hydrologic	• Flooding (riverine) • lake and sea-shore wave action • Waterlogging • Sea-ice and icebergs • Runoff drought • Glacier advance
Geologic	• Mass-movements (landslides, avalanches, mudflows, subsidence) • Erosion (foundations, soils) • Silting (dikes, rivers, harbors, farming) • Earthquakes • Volcanic eruptions
Biologic	• Severe epidemics in humans, plants, domestic and wild animals • Animal and plant invasions (e.g., locusts) • Forest and grassland fires
Technologic	• Transport accidents • Industrial explosions and fires • Accidental releases of toxic gas • Nuclear power plant failures • War or Civil Strife • Germ or nuclear warfare

Source: Modified after Hewitt and Burton (1971)

growing need for pre-disaster preparedness. Catastrophes, such as the Loma Prieta (1989) and Northridge (1994) earthquakes, hurricanes Hugo (1989), Andrew (1992) and Iniki (1992), and the Midwestern floods (1993) have triggered new demands for disaster planning and

mitigation strategies. Mitigation is the elimination or reduction of the frequency and intensity of hazards (McLoughlin, 1985: 170). Mitigation requires the identification of risks to a community's health, safety, and welfare, and the implementation of a risk reduction program (Petak, 1985: 3). Disaster preparedness is defined as "the pre-arranged emergency measures which are to be taken to minimize the loss of life and property damage following the onset of disaster" (Smith, 1992: 88). Measures include the promotion of public education and awareness programs, the development of evacuation plans, supply of medical aid, and the preparation of emergency food and shelter for evacuees (Smith, 1992: 88-89). The goal is to make survival possible when emergency facilities and personnel are not immediately available.

A key challenge for planners has been how planning processes can encourage citizens, especially those who live in hazardous areas, to learn about risks and to become better prepared themselves to deal with disasters. Individual decisions, such as storing food and water, retrofitting structures, and establishing pre-designated evacuation routes are making a difference.

However, viable planning and mitigation strategies have been difficult for two reasons: unpredictability of events and an apathetic public. One of the central themes in disaster research is the public's apparent indifference to hazard risks, and therefore, lack of involvement in planning precisely because most disasters cannot be forecast. In the past, disaster policies relied on costly federal response and financial disaster assistance. Little attempt was made to educate the public or work with them to mitigate hazard risks in their

community or workplace. Government officials charged with the responsibility to minimize loss of life and property damage have struggled with how to convince citizens to prepare. It appears people are reluctant to invest in preparedness for a disaster that may never come. Now, the prime objective of planners is to encourage citizens to take more responsibility for disasters readiness, and rely less on federal post-disaster relief assistance.

Clearly, there is a need for strengthening public agencies in disaster planning by bolstering public involvement as well as other aspects. In the United States, the lead organization responsible for disaster planning is the Federal Emergency Management Agency (FEMA). In the past FEMA has been criticized for limiting itself to "a crisis-reactive management approach" (Petak, 1985: 3). Growing losses call for a proactive stance involving all aspects of the community in the areas of mitigation and preparedness. Some FEMA Region X officials suggest that "communities are the proper front-line level for emergency management, where people have face to face relationships and have a sense of community responsibility to each other" (FEMA Region X, 1994: 1). During calamities, that level may be supplemented with more professional services only if and when needed. At this time there is limited research on how this type of integrated planning has been done or could be done.

This thesis will feature a case study that describes how one county in Oregon is trying a new approach to disaster planning to reduce future disaster losses. It will trace the planning processes that local officials have undertaken to create a more effective planning procedure by engaging a larger portion of the community.

One alternative approach to crisis-reactive management initiated by FEMA Region X is known as Community-Based Emergency Preparedness (CBEP). It is the basic approach adopted by Benton County. Emergency authorities would establish a more effective contact with the community and familiarize citizens with emergency planning and operations. Officials at FEMA Region X support grass-roots organization because their research shows that 80 percent of response efforts in the first 72 hours of recent major emergencies took place at the neighborhood and household levels (FEMA, 1994: 1). With the CBEP approach, citizens, private businesses, schools, neighborhood groups, professionals, and hospital would participate in the planning process through emergency preparedness seminars and/or training courses (FEMA, 1994: 1). From the planners' perspective, involving the public in the planning process could increase public trust in government, identify the community more closely with decision making, improve public services, and educate citizens (Alexander, 1986: 105). Taken together, this translates into greater self-sufficiency and less reliance on immediate federal government assistance. There has been limited research done on the Community-Based Emergency Preparedness (CBEP) approach because it is so new. This thesis will attempt to look at empirical information on the planning process attempting to follow a community-based plan.

CHAPTER 2
METHODOLOGY

Purpose and Main Objectives of Study

The overall purpose of this study is:

> To describe how one county in Oregon plans and prepares, and mitigates for disasters related to its own goal of Community-Based Emergency Preparedness (CBEP).

The six main objectives of this case study of Benton County are specifically:

1. To compare the Traditional Emergency Management System (TEMS) and Community-Based Emergency Preparedness (CBEP) models specified by the researcher for this study with the emergency management approach in Benton County.

2. To explain the organizational structure, roles, responsibilities, and priorities among federal, state and local governmental agencies that are responsible for disaster planning.

3. To examine leadership style in a citizen participation disaster planning process.

4. To describe citizen participation and decision making in the disaster planning process.

5. To investigate the role of geoscientists, engineers and other experts in disaster planning.

6. To determine the nature and outcome of disaster planning.

Research Method

The research methodology is a case study of disaster planning in one county in Oregon. The study covers a twelve-month period from April 1994 to April 1995. Case study methodology is one type of qualitative research that describes "a set of events and relationships within a given framework of ideas and procedures" (Hitchcock and Hughes, 1991: 214). Ary et al. (1990) write that the ultimate goal of this type of inquiry is "to portray the complex pattern of what is being studied in sufficient depth and detail so that one who has not experienced it can understand it" (p. 445). The case study is "a research strategy which focuses on understanding the dynamics present within a single setting" (Eisenhardt, 1989: 534). For example, Whyte's (1943) study of Cornerville; Selznick's (1949) description of the Tennessee Valley Authority (TVA); and Allison's (1971) analysis of the Cuban Missile Crisis are three classic case studies that illustrated "how" and "why" questions about an event in a real-life context (Yin, 1989: 20). The case study is the "method of choice when phenomena under study is not readily distinguishable from its context" (Yin, 1993: 3). In other words, a case study methodology allows the researcher to preserve holistic and meaningful characteristics of actual incidents within organizations, processes, programs, and events (Yin, 1989: 22-23).

For the purpose of this study, a single case represents an empirical inquiry to describe disaster planning in all its real-world

complexities. Because the boundaries between phenomenon and context are unclear, multiple types of information are used (Yin, 1989: 23). For this case study, data was collected from three sources: semi-structured interviews, documents, and participant observations. Triangulation, "using more than one method of data collection in a single study," checks validity of data, and verifies which data converge (Hitchcock and Hughes, 1991: 104). Triangulation of methods ensures multiple perspectives, improves the quality of information, and provides cross-checks (Beebe, 1995: 2).

Interviews

The primary source of data was semi-structured interviews with a concerned citizen, emergency services coordinator, the sheriff, in addition to representatives at the state emergency agency, Oregon Emergency Management (OEM), and the Federal Emergency Management Agency (FEMA) Region X. Notes were taken during the interviews. The typed notes were then given to these individuals to be verified for accuracy. Corrections were made, and verified by informants. Rather than use individual names of informants, it was decided to identify them by using either functional position title (i.e., Sheriff, Emergency Services Coordinator) or by a descriptive phrase. For example, a "Key Informant" was an individual who had several roles in the Benton County planning process: chairperson, community activist and educator, concerned citizen, proposal writer, and policy maker. To reduce possible confusion that more than one person served in these roles, all interviews from this individual were

identified as Key Informant, as suggested in similar cases by Whyte (1984).

All interviews were conducted at individuals' convenience usually during the day for those persons who worked for Benton County. For the Key Informant, the interviews were conducted at her residence. Over 38 hours of interviews took place during the 12 months of the study. The interviews took place in Oregon (Corvallis, Salem, Portland, and Bend), and at FEMA Region X offices in Bothell, Washington. The bulk of the interviews were supplied by four individuals: Key Informant, Emergency Services Coordinator, Sheriff, and FEMA Region X representative. Interviews ranged from 15 minutes to 3 hours in length, in person or on the telephone.

These interviews provided insight into the current policies and procedures taking place specific to disaster planning. The goal of interviewing local officials was not only to gain knowledge of the planning process, but also to gain a better understanding of what they thought was and was not working in disaster planning in Benton County. Appendix C contains documentation of these interviews.

Documents

Available government reports, legal documents, memorandum, and informational pamphlets and videotapes from federal, state, county, and local agencies responsible for disaster planning were reviewed. Emergency plans from other counties in Oregon, as well as plans from other states, were reviewed. Specific documents, such as the Benton County budget, were also obtained. These documents

provided retrospective and prospective viewpoints on disaster planning policies.

Another source of document data were source maps from various agencies, such as FEMA; Soil Conservation Service; Oregon Department of Geology and Mineral Industries (DOGAMI); U.S. Geologic Survey; and Benton County Public Works Department. These data were used to determine the scientific basis for planning. Digital maps displaying multiple hazards in Benton County were developed at Benton County Public Works Department. The computer software program, AutoCad Version 12, was used to depict hazards in relationship to population by different geographic areas. These maps were verified for accuracy by geomorphologists, geologists, and engineers at Oregon State University, as well as specialists from Corvallis and Philomath rural fire protection districts, and Oregon Department of Forestry. Documents that were reviewed as part of this study are listed in References.

Participant Observations

The final major source of data was participant observations similar to that used in ethnographic studies (Jorgensen, 1989). One of the defining characteristics of ethnographic research is that the investigator goes into the field, instead of bringing the field to the investigator. Orum, Feagin, and Sjoberg (1991) add that participant observations are useful "because investigators often can acquire a rendering of the activities only by participating in those activities (p. 4). Fitchen (1990) describes the goal of this type of qualitative research, "to see the world through the eyes of another person" (p.

15). Schwartzman (1993) states, "Ethnography is the trademark of cultural anthropology" (p. 1). Malinowski (1922) describes ethnography as grasping "the native's point of view" (p. 25).

For the purpose of this research, participant observations were conducted at Benton County Emergency Management Council bi-monthly meetings, Benton County Commissioners meetings, Oregon Emergency Management annual meeting of county emergency managers, FEMA Region X Mitigation Forum, FEMA's Professional Development Series Planning Course, and Panel Discussions and Seminars at Oregon State University. Also, participant observations were made during local and statewide emergency drills and exercises, training workshops, and public educational seminars, Council meetings, and state annual workshop. Notes were taken during these events. The observations were discussed and verified with individuals during subsequent interviews.

At times, an event was observed with no participation by the researcher; other times, the researcher participated in the event. For example, during Professional Development Series (PDS) training session on Disaster Planning (May 17-20, 1994), the researcher worked in small groups with county emergency planners throughout Oregon formulating emergency operations plans exercises. Other examples were during 1994 (May 18, July 20, Oct. 19, Nov. 16,) and 1995 (Jan. 18, March 15) Benton County Emergency Management Council meetings where the researcher asked questions to clarify information. At other times, the researcher only observed and took notes. During the course of this study, the researcher attended six Council meetings, two training sessions, three public awareness

events, and one emergency drill. Furthermore, the researcher made a presentation at the Oregon Academy of Sciences annual meeting at Reed College (Feb. 25, 1995), as well as a presentation at the March 15, 1995, Benton County Emergency Management Council meeting in Corvallis. Appendix C contains documentation of these participant observations.

This research methodology was guided by general systems theory (Kast and Rosenzweig, 1979; Shafritz and Ott, 1991) which is appropriate when describing interrelated, complex issues such as disaster planning. The following description captures key concepts:

> The systems approach facilitates analysis and synthesis in a complex and dynamic environment. It considers interrelationships among subsystems as well as interactions between the system and its suprasystem and also provides a means of understanding synergistic aspects. This conceptual scheme allows us to consider organizations -- individuals, small-group dynamics, and large-group phenomena -- all within the constraints of an external environmental system (Kast and Rosenzweig (1979: 17-18).

While there are many variables that could be examined in disaster planning, this study focused on six characteristics:

1. Organizational structure
2. Problem identification
3. Leadership approach
4. Citizen involvement
5. Role of experts
6. Outcome

These six aspects are derived from broad themes which currently exist in disaster research literature. Limiting this study to these six

aspects establishes a framework to compare and contrast two conceptual disaster planning approaches: Traditional Emergency Management System (TEMS) and Community-Based Emergency Preparedness (CBEP). Table 2 illustrates this case study's methodology of triangulating informational sources with the six process characteristics.

Table 2: Methodology for Triangulation

Process Characteristics	Semi-Structured Interviews	Documents	Participant Observation
Organizational Structure	√	√	√
Problem Identification	√	√	√
Leadership Approach	√	√	√
Citizen Involvement	√	√	√
Role of Experts	√	√	√
Outcome	√	√	√

CHAPTER 3
DEVELOPMENT OF U.S. DISASTER PLANNING

The historical overview will describe almost two centuries of disaster planning in the United States. It includes interpretation of the evolution of emergency management as traced through legislative enactments, executive orders, policy development, and agency formation.

Limited Role of Government (1803-1950)

Until the latter part of the 19th century, there were no special efforts made for disaster planning at the national level. In fact, Congress did not pass any disaster relief legislation until it granted financial assistance after a devastating fire razed the town of Portsmouth, New Hampshire, in 1803 (Clary, 1985: 20). Later, some local volunteer organizations formed to deal with calamities. For example, disaster victims and their families depended on their community, church, relatives, and immediate relief services from the American Red Cross, a non-governmental agency founded in 1881 (Rubin and Popkin, 1990: 79).

Congressional legislation was considered on an ad hoc basis, and responded only to specific disasters. Clary (1985) noted that from 1803 to the 1930s, only 100 such pieces of legislation were enacted (p. 20). Today, the Comptroller General estimated that about 35 Presidential disaster declarations have been issued each year (GAO/T-RCED-93-20, May 18, 1993: 6). Since the scope of federal social services for disaster recovery has increased, a subsequent

pattern of growing reliance on federal disaster relief assistance has developed by the state and local levels. This is most evident in California, where Governor Wilson has declared a state of emergency, a move which triggers federal assistance, thirty times since 1991 (*Harper's Index*, April, 1995: 13).

New Deal Period (1930s)

During the New Deal Era, a patchwork of agencies, departments, and councils were created. Two federal agencies, the Public Works Administration (1930) and Works Progress Administration (1935), were established to stimulate the U.S. industrial recovery from the Depression by pumping federal funds into large-scale construction projects. Many levees, dams, channels, and other structures were built by the Public Works Administration and Works Progress Administration as the result of the Flood Control Act (1936). This enactment established a permanent federal role in dealing with flood hazards when it specified:

> The Federal Government should improve or participate in the improvement of navigable waters or their tributaries, including watersheds thereof, for flood control purposes if the benefits to whomsoever they may accrue are in excess of the estimated costs... (Viessman Jr., and Welty, 1985: 38).

This legislation was the impetus to use the latest science, engineering and planning in order to prevent or lessen the impact of flooding. With this Act, the federal policy approach began to rely

upon scientific knowledge and technological principles to protect life and property (Waddell, 1977; Hewitt, 1983). Despite the expenditure of an estimated $14 billion for flood control by the Army Corps of Engineers over a period of 40 years, flooding has remained a formidable hazard (May and Williams, 1986: 65).

Expansion of Government: Civil Defense Era (1950-70)

In the 1950s, disaster planning evolved in the context of the Cold War. The first legislation in the United States to deal with pre-disaster planning on an on-going basis was the Federal Civil Defense Act and the Disaster Relief Act in 1950 (Dynes, 1990: 2; McLoughlin, 1985: 166). This Act provided assistance to states and local governments to repair roads and local government facilities in communities and states overwhelmed by large disasters to restore essential public services (U.S. House of Representatives, Dec. 14, 1994: 7). Individuals, voluntary relief organizations, and local and state governments were responsible for providing disaster services, while the federal government's role was supplementary (ibid.). Local and state emergency agencies were required to formally request the federal government's assistance during disasters. Furthermore, Congress intended the federal government to also share much of the fiscal and planning responsibilities with state and local governments (May and Williams, 1986: 111).

In the 1950s, program implementation was assigned to the Secretary of Defense who set up the Defense Civil Preparedness Agency to handle emergency planning responsibilities. A study by

Dynes (1990) showed that emergency planners during the demobilization period following World War II were generally "ex-military" personnel. Previous military experience was the most critical and perhaps the only qualification for emergency planners (Dynes, 1990: 3). Dynes found many local communities were unsure of what emergency planning entailed; the ex-military personnel tended to focus on civil defense issues while other disasters tended to be ignored.

In 1958, the Civil Defense Act of 1950 was amended to clearly identify the responsibility of each level of government for civil defense. The Act intended preparedness for nuclear attack to be a joint federal-state-local responsibility, and federal financial assistance was offered, but required that state and local jurisdictions match federal funds for personnel and administrative expenditures intended only for civil defense preparedness, not for natural disasters (Clary, 1986: 112).

A Congressional-mandated study on civil defense concluded: "The American public was vulnerable to, and ill-prepared for, a Soviet ICBM nuclear attack" (Herken, 1987: 115; Sylves, 1994: 304). This study urged President Eisenhower to undertake a vast civilian shelter program (Sylves, 1994: 307). By 1962, the threat of nuclear attack intensified, thus the need for civil protection and preparedness increased. At the time of the Cuban Missile Crisis during the Kennedy administration, the civil defense program reached its highest level of governmental support (May and Williams, 1986: 111). In 1961, the National Fallout Shelter Survey Program was implemented to protect citizens from radioactive fallout

during a nuclear attack. Congress appropriated $294 million for civil defense in fiscal year 1962 (May and Williams, 1986: 111-112). Military concerns dominated disaster planning at the federal level, while preparedness for natural disasters was neglected. In contrast, at the local level, concerns about disaster planning were based less on military and more on non-attack related disasters (i.e., earthquakes, hurricanes, and floods). This brought confusion about how the federal, state and local agencies defined their respective emergency management roles.

Local Civil Defense Offices (1960s)

During the late 1960s, Quarantelli (1988) examined the organizational structure of local civil defense offices, or city and county agencies that took on core responsibilities for disaster planning. He found wide variation in the purpose, structure, and functions of selected local civil defense offices (p. 2). For example, some local civil defense organizations emphasized natural disaster concerns; others did not. Some were autonomous groups; others were integral parts of other organizations in the governmental structure. Additionally, federal civil defense agency officials began to consider whether they should standardize local offices or not (ibid.)

The Quarantelli (1988) study showed that during the 1960s few communities were well-organized for serious disaster. Indeed, the overall picture looked dismal. For instance, local offices often failed to set up an Emergency Operating Center (EOC), which was considered vital for maintaining communication and coordinating

response efforts during emergencies. There were no written disaster plan blueprints for them to follow. Since natural disaster preparedness planning was secondary to civil defense issues, emergency response by local offices was "problem plagued" (p. 4). Quarantelli (1988) also discovered that local emergency agencies did not have the capability to deal with both attack-related civil defense preparedness and non-attack related disasters.

By the 1970s, federal emergency management efforts were being criticized by state and local officials (May and Williams, 1986: 35). As the threat of enemy attack subsided, the national civil defense program was expanded to cover "dual use" (both civil defense and natural disaster preparedness). This policy allowed state and local governments to use federal civil defense funding for natural disaster preparedness. Local emergency agencies welcomed this change in policy since they could use personnel, equipment, and facilities for responding to natural or civil defense incidents. However, a serious conflict ensued. While states were told they could use federal funding for natural disaster planning, federal policies continued to favor funding for civil defense planning (Settle, 1985: 101). Increasingly, policies at the community level focused on local emergencies. Local policy, which was shaped by natural disasters, clashed with national policy, which was driven by security issues. Consequently, planning efforts were further divided between local and federal levels.

Increase in Disaster Legislation (1960s-1970s)

Key federal legislation regarding hazard reduction and disaster relief and recovery was enacted during the 1960s to 1970s (Clary, 1985: 26). Two main characteristics of federal legislation, which is summarized in Table 3, are: (1) legislation includes both structural and non-structural approaches to hazard mitigation; and (2) disaster legislation is mostly enacted following calamities. (For state and local mitigation legislation and discussion, see Table 5).

Analyzing the first column "pre-disaster mitigation and prevention," it is apparent that early federal hazard policies concentrated on a more structural approach to flood prevention, such as the Flood Control Act of 1936, whereas more recent federal hazard policies took a non-structural approach to preserve and restore natural floodplains in 1977 (Executive Orders 11988 and 11990). Federal policies initially attempted to control flooding by building dams and other structures. By the 1960s-1970s, some legislation had been passed that incorporated alternative, non-structural means to prevent hazard events such as insurance, and preservation of natural floodplains.

Scholars note that quite often legislation passed soon after disasters (May, 1985; Rossi, Wright, Weber-Burdin, 1982). It appears that Congress took a reactive approach when it passed disaster legislation in the aftermath of Hurricane Camille in 1969. This calamity, which killed over 250 people in Louisiana and

Table 3: Federal Hazard Policies and Related Developments by Stages of Emergency Management

Level	Pre-Disaster Mitigation and Prevention	Pre-Disaster Preparedness and Disaster Response	Post-Disaster Recovery
Federal	♦ Corps of Engineers Structural flood control program (Flood Control Act of 1936) ♦ Cirrus and Stormfury hurricane seeding projects (1947-1973) ♦ Flood hazard maps & floodplain management plan (National Flood Insurance Act of 1968) ♦ Funds for state coastal land-use planning (Coastal Zone Management Act of 1972) ♦ Inspection of nonfederal dams (National Dam Inspection Act of 1972) ♦ Public recipients of disaster relief funds must evaluate natural hazards and take action to mitigate them (Sect. 406, Disaster Relief Act of 1974) ♦ Mandates development of earthquake prediction methodology, Sect. 5 (c), (2), Earthquake Hazard Reduction Act of 1977 ♦ Preservation and restoration of natural floodplains (E.O. 11988 and 11990, 1977)	♦ Procedures establishing disaster declaration (Disaster Relief Act of 1950) ♦ State grants for disaster relief planning (Sec. 8, Disaster Relief Act of 1969) ♦ Creation of Federal Emergency Management Agency (E.O. 12127, 1979) ♦ Emergency Planning and Community Right-To-Know (Superfund, SARA Title III) (1986) ♦ FCC Updated Emergency Broadcast System with new Emergency Alert System (1994)	♦ Creation of Federal Crop Insurance Corporation (Agricultural Adjustment Act of 1938 ♦ Administrative framework for disaster relief (Disaster Relief Act of 1950 and subsequent acts and amendments ♦ Disaster-specific relief acts, often expanding aid programs (e.g., ♦ Pacific Northwest Disaster Relief Act of 1965) ♦ Flood Insurance (National Flood Insurance Act of 1968) ♦ FEMA administrative rule establishing non-negotiated cost split (1980) ♦ National Flood Insurance Reform Act of 1994 was passed to inform lender compliance and inform flood-plain property buyers and owners of flood insurance purchase requirement

Source: Modified from Clary, 1985: 26

Mississippi, became the driving force for Congress to pass the Disaster Relief Act of 1970. This Act mandated that:

> jurisdictions receiving federal aid must evaluate natural hazards and take measures to mitigate them, the purpose being to prevent reoccurrence of the disaster or lessen its impact (Section 406) (Clary, 1985: 25).

Legislators assumed that states and LEMAs implementing mitigation activities would reduce the future impact of natural disasters, and, consequently, the demand for federal assistance (This objective has yet to be realized).

Congress has been criticized for being overly optimistic about the means available to accomplish the goal of predicting earthquakes (ibid.). For instance, one section of the Earthquake Hazards Reduction Act (1977) required:

> The implementation in all areas of high or moderate seismic risk, of a system (including personnel, technology, and procedures) for predicting damaging earthquakes and for identifying, evaluating and accurately characterizing seismic hazards (Section 5 (c)(2), 1977).

In addition to the typical administrative problems, such as planning, staffing, and organizing, legislators neglected a key factor: the limitations of earthquake prediction technology (Clary, 1985: 21).

Therefore, legislation enacted in the aftermath of disasters may be impractical and counterproductive.

Formation of Federal Emergency Management Agency - 1979

The federal government's role in emergency management became more defined in the late 1970s when President Carter sought to integrate all the agencies under one umbrella agency. In 1978, Carter submitted Reorganization Plan No. 3 to Congress to consolidate the federal responsibilities for the purpose of emergency management (Executive Order 12127, 1979). Many applauded this reorganization plan for centralization because the federal disaster system had been fragmented and uncoordinated (Clary, 1985: 21).

In 1979, the Federal Emergency Management Agency (FEMA) was created in order for the federal government to assume more authority and offer resources when state and local governments needed emergency assistance. FEMA took over a number of earlier agencies including the National Fire Prevention and Control Administration, the Federal Insurance Administration, the Federal Emergency Broadcast System, the Federal Disaster Assistance Administration, and Federal Preparedness Agency, in addition to the Defense Civil Preparedness Agency, the principal civil defense agency that had been a subsidiary of the Department of Defense (McLoughlin, 1985: 166-167). FEMA was to act as a coordinating body over 27 other federal agencies and the American Red Cross. It was mandated by Congress to create and implement programs dealing with flood control, dam safety, earthquake mitigation, and preparedness (FEMA, 1992; May and Williams, 1986). It was also

responsible for giving federal assistance directly to citizens recovering from disasters (Sylves, 1994: 303). Hence, the agency, with nearly 2,600 full-time employees had a complicated task to coordinate a wide range of programs among various levels of agencies.

Since the early 1980s, FEMA has promoted a coordination strategy known as Integrated Emergency Management System (IEMS) (Clary, 1985; Petak, 1985; McLoughlin, 1985; May and Williams, 1986; Sylves, 1994). The IEMS approach intended to shift from a narrow, single hazard program orientation (e.g., civil defense) to a broader, multi-hazard planning approach (McLoughlin, 1985: 166). Integrated also refers to incorporating four interrelated emergency management components (mitigation, preparedness, response, and recovery) into state and local agencies emergency programs. These four integral parts are:

> 1. *Mitigation*: Activities which eliminated hazards, reduced the probability of their occurrence, or reduced the disastrous effects of unavoidable hazards. In order to alleviate the impact or prevent a hazardous event, one might strengthen building codes standards, retrofit structures or change land-use planning requirements.
>
> 2. *Preparedness*: Emergency plans were developed to save lives and minimize damage. This included creating warning systems and other means in advance to minimize damage.
>
> 3. *Response:* Activities which provide emergency assistance during and immediately after a disaster strikes. This included search and rescue, and providing food, shelter, and clothing.
>
> 4. *Recovery:* Restoring social systems after disaster impact, by developing programs to allow individuals to rebuild. The long-term reconstruction of a community

> implemented over a period as long as 10 years (McLoughlin, 1985: 166; Clary, 1985: 20; Petak, 1985: 3).

Re-birth of Civil Defense (1980s)

FEMA embraced an all-hazards approach, as opposed to a single hazard approach (i.e., civil defense), to disaster planning starting in the late 1970s with President Carter. This approach was defined as "a functionally-oriented capability that may be applied to all hazards or any type and size of disaster" (FEMA, 1994). However, during the 1980s, the Reagan Administration re-established civil defense as an important element in upgrading national defense policy (May and Williams, 1986: 40). In 1981, Congress amended the Civil Defense Act (P.L. 97-86) so that states could use federal funds for:

> Preparing for and responding to natural disasters to the extent that the use of such funds for such purposes is consistent with, contributes to, and does not detract from attack-related civil defense preparedness (Section 207).

The Reagan Administration's strong domestic civil defensive strategy is best illustrated by six years of research funding of over $17 billion dollars to protect the nation with SDI (Strategic Defense Initiative) (*Time*, June 26, 1989: 20). According to a 1994 General Accounting Office (GAO) report, this conflict between civil defense and all-hazard planning still continues (GAO/T-RCED-93-20: 23). It claimed that FEMA's domestic emergency management staff and its national civil defense staff are still divided (National Academy of Public

Administration report, 1993: 53-54; Sylves, 1994: 304). NAPA's report disclosed:

> About 38 percent of FEMA's total staff and about 27 percent of its budget (excluding the disaster relief fund) is now dedicated to national security emergencies; foremost among them is all-out nuclear war (NAPA, *Coping with Catastrophe* , 1993: 53).

The report claimed FEMA was maintaining a top secret program of civil defense at a time when the threat of nuclear attack had diminished (Cox News Service, Feb. 23, 1993). At a time when there was little danger from nuclear attack, FEMA spent more than $1.3 billion on equipment, support facilities, and personnel to provide communications for government leaders in the event of a nuclear war, which was "roughly 12 times more than the $243 million FEMA spent during those 10 years preparing for natural disasters" (ibid.).

Meanwhile, FEMA continued to neglect local planning and response activities as the country was inundated with a variety of natural and human-induced calamities. Technological catastrophes at Three Mile Island (March 1979), as well as overseas at Chernobyl (April 1986) and Bhopal (December 1984) cost billions in recovery efforts. Furthermore, risks from transporting hazardous materials were increasing. In 1985, McLoughlin wrote, "Four billion tons of hazardous materials move through the (U.S.) transportation system each year" (p. 165). In response, growing concern about hazardous materials incidents led to the enactment of the Emergency Planning and Community-Right-to-Know Act of 1986 (Hadden, 1989;

Bolstridge, 1994). This Act was meant to provide citizens with information to plan for emergencies involving the release of dangerous chemicals. The measure also required each state to establish Local Emergency Planning Committees (LEPCs). Over 4,000 local emergency planning districts have been established, however five of the State Emergency Response Commissions (SERCs) designated the entire state as one district, including Oregon (EPA, 1990). These groups are supposed to gather and disseminate information on hazardous chemicals in a community.

Stafford Act (1988)

In 1988, federal responsibilities were re-defined again in the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-288) to improve disaster response and set federal rules and limitations. It was intended to clarify the responsibilities of each level of government following disaster. The Act sought to improve inter-government communication, and to understand capabilities and limitations. The Act listed six responsibilities of FEMA:

1. Revising and broadening the scope of existing disaster relief programs (to include an all-hazards approach);
2. Encouraging the development of comprehensive disaster preparedness and relief program;
3. Achieving greater coordination and responsiveness of disaster preparedness and relief programs;
4. Encouraging individual, state and local governments to protect themselves by obtaining

insurance coverage to supplement or replace governmental assistance;

5. Encouraging hazard mitigation measures to reduce losses from disasters, including development of land use and construction regulations; and
6. Providing federal assistance programs from both public and private losses sustained in disasters (Stafford Act, 1988, Section 101 (b): 1).

Section 407 of the Stafford Act required state and local governments who were receiving federal disaster assistance to prepare a plan for averting recurrence of losses. If communities were unwilling to plan, the federal government had the authority to withhold future disaster assistance (May and Williams, 1986: 8-9). Hence, FEMA had some leverage to influence LEMAs and state agencies to re-evaluate non-structural mitigation, land use, building codes standards and technical assistance.

Re-evaluating Local Emergency Management Agencies 1980

Quarantelli (1988) completed a follow-up study marking the progress and problems of local emergency management agencies (LEMAs) since the 1960s when he analyzed local civil defense offices. As with the previous 1960s study, the 1980s research revealed that there was still tremendous diversity in the structure, location, mission, responsibility, funding, and role among local agencies, as seen in Table 4. For instance, some LEMAs were located within the Mayor's office, while others were an added-on responsibility within the fire, public safety, or even streets and sanitation departments. Some LEMAs were a lead agency, or completely independent city or

county agency. Tasks were prioritized according to local or national needs, as seen with the all-hazards mission or war-time orientation. However, types of functions and responsibilities often depended upon the level of support and funding. Many relied on a combination of city-county-state-federal financial assistance. For example, some LEMAs with a part-time employee could only handle being an information gatherer during an emergency.

Some local governments appropriated more local funds, which enabled them to hire more personnel or buy equipment. Thus, some LEMAs could offer more services (i.e., temporary housing, victim counseling) than others.

Heterogeneity of LEMAs reflected local community conditions and local history (Quarantelli, 1988: 4). LEMAs mirrored the varied conditions which are found in different communities. Quarantelli (1988) predicted that if FEMA tried to further standardize disaster planning, LEMAs would become artificial entities without local roots (p. 4). Moreover, Quarantelli maintained, if a federal model was imposed, communities would consider it outside interference. Quarantelli's findings were based on 20 years of research: There is no universal best model for disaster planning and mitigation.

Another finding from the Quarantelli study was an increase in the quantity and quality of disaster preparedness activities undertaken by local agencies from 1960 to 1980. The study found that improvements in disaster preparedness were not "across-the-board," however, some types of local offices appeared to be better at planning than others (p. 6). It was found that communities that went through a process of disaster planning (i.e., meetings, community

Table 4: Examples of Heterogeneity among Local Emergency Management Agencies (LEMAs)

Types of Heterogeneity	Examples
Department Names	• Division of Emergency Assistance & Preparedness • Office of Civil Defense • Emergency Preparedness Group • Bureau of Civil Emergency • Emergency Management Agency • Civil Defense and Preparedness Bureau • Disaster Emergency Services
Location of Organizational Structure (apart from city/county)	• Dept. of Streets & Sanitation • Division of Public Safety • Staff within Mayor's Office • Chief Administrative Office of the County • Part of Fire Department • Independent city and/or county agency
Mission	• Only natural disasters • All-hazards (sudden natural/technological hazards) • Those involved with 9-1-1 systems • Counter-terrorism activities • Homeless and poverty programs • Some only have wartime orientation; others only peacetime
Tasks/Responsibilities	• Emergency preparedness & response • Focus on mitigation and recovery tasks • Land-use Planning • Building Codes • Regulation of Hazardous Material • Temporary Housing • Victim Counseling • Redevelopment Loans • Planning for Evacuation • Damage Assessment and Control • Search and Rescue
Funding	• Combination city-county-state-federal or only local funding • Some have very sparse budgets • Few have large budgets for special tasks/missions
Major Role	• Different degrees of emphasis on: ⇒ Planning ⇒ Resource Provider ⇒ Coordination ⇒ Information Gatherer • Might be an isolated activity • Part of interorganizational core • A lead agency

Source: Adapted from Quarantelli, 1988: 4-5

education, and public involvement) were better prepared than communities that only had a Standard Operation Plan (SOP) on paper (ibid.). Again, these findings emphasized the importance of the process of disaster planning rather than the disaster plan itself.

It appears that FEMA has not fulfilled its responsibilities as outlined in the Stafford Act, which charged the agency with monitoring and measuring state and local preparedness. A 1993 GAO report uncovered shortcomings with how FEMA helped state and local government officials train and conduct exercises in anticipation of disasters (p. 23). Most state officials told the GAO that their state disaster exercises did not adequately prepare them to respond to disasters. These officials cite such problems as too few exercises, low federal participation, and failure to act on weaknesses identified (p. 24). In terms of measuring effectiveness, the GAO report concluded:

> Greater preparedness and accountability for state and local governments are needed to ensure that they can respond to disasters. However, FEMA is neither organized for, nor carries out, the type of oversight needed to ensure that deficiencies are identified and corrected. FEMA Headquarters sets policies and establishes training programs but does not monitor state performance.... Regional officials told GAO that headquarters has neither established performance standards nor developed a program for evaluating state and local preparedness for disaster response. Therefore, the regions have no uniform national standards that can be used to judge state and local readiness (p. 25).

State and Local Mitigation Initiatives (1960s)

Starting in the 1960s, several state and local entities began to pass their own legislation when the federal government's disaster planning policies appeared to be inadequate (See Table 5). This signified a resurgence of innovative policy initiatives at the state and local level to respond to special state needs, specifically mitigation and hazard activities (Hadden, 1989). For example, one section of Oregon passed a Statewide Land-Use Plan (Goal No. 7, 1973) which also focused on natural hazards. This legislation required each locality to inventory hazards and locate damage-prone development in risk areas in their comprehensive plans.

Other examples of state initiatives included California's Cobey-Alquist Act (1965), which required local floodplain regulations to be consistent with state standards (Clary, 1985: 22). If they were not, the state would not participate in cost-sharing on federal flood control projects (Clary, 1985: 22). Next, the Flood Relocation and Land Exchange Law (1979) allowed Arizona to designate land as flood-prone, condemn private lands within these areas and exchange state land for these properties (Clary, 1985: 22). And the Alquist-Priolo Special Studies Zone Act (1972) required geologic maps of known seismic zones to be made in California. Local governments were required to use these seismic risk maps in making land-use decisions regarding proposed projects (ibid.).

In addition to state mitigation legislation, cities and counties also passed similar controls such as easements, acquisition, or moratoria (Clary, 1985: 25-26). (See Table 5). One explanation of locally initiated hazard policies may be a high level of exposure to

hazards. For instance, in areas with a history of catastrophes, such as earthquake-prone California and/or hurricane-susceptible Florida, the likelihood of action appears to be higher. For example, Los Angeles passed an ordinance that required certain types of pre-1938 buildings with unreinforced masonry bearing walls to be retrofitted to withstand earthquake shocks.

Table 5: State and Local Emergency Agencies Initiatives for Disaster Mitigation

Level of Government	Disaster Mitigation and Prevention Initiatives
State	♦ Local floodplain regulations must be consistent with state standards (Cobey-Alquist Floodplain Management Act of 1965-California) ♦ Regulation of construction practices in zones of known seismic hazard (Alquist-Priolo Special Studies Zone Act of 1972-California) ♦ Natural hazard prevention as a goal of comprehensive statewide planning (Oregon Statewide Land-Use Planning Program-Act of 1973) ♦ State land trade for property in floodplains (Arizona Flood Relocation and Exchange Law of 1979) ♦ Legislation is passed Florida in 1991 allowing fees to be collected from insurance companies for emergency planning trust fund
Local	Counties and cities have passed regulations for disaster mitigation and other hazard control techniques: ♦Risk zoning ♦Subdivision control ♦Hazard building codes ♦Acquisition of hazard areas ♦Hazard-prone land leased with restrictive covenants ♦Hazard easements ♦Development moratoria ♦ Growth controls

Source: Modified after Clary, 1985: 26

Another example of local governments taking the lead in hazard mitigation is seen in Cowlitz County, Washington, following Mt. St.

Helen's eruption, May 18, 1980 (ibid.). The county enacted a moratorium on growth in areas subject to volcano-related flooding. In Sanibel Island, Florida, a growth lid was established according to the number of people who could be evacuated in the event of a major hurricane (Clary, 1985: 22). Lastly, in St. Petersburg, Florida, hazard maps called "Sea, Lake, and Overland Surges from Hurricanes" (SLOSH) were created by National Oceanic Atmospheric Administration (NOAA) to show specific areas most susceptible to flooding (Pinellas County, Florida, Emergency Services, August, 1991). Overall, state, county, and local entities assume that these examples of hazard mitigation initiatives may reduce immediate and long-term costs to areas vulnerable to hazard risks.

Re-evaluating FEMA (1990s)

During the early 1990s, prompted by state and local initiatives and rising costs of disasters, FEMA started to take a hard look at mitigation and pre-disaster preparedness. The United States was hit by several devastating and costly disasters: Hurricane Hugo - Southeastern U.S. and Caribbean (1989), Loma Prieta-San Francisco Bay Area earthquake (1989), Hurricane Andrew - Caribbean, Florida and Louisiana (1992), and the Mississippi Flooding (1993). Many criticized FEMA's response during these catastrophes (Schneider, 1992; Rubin and Popkin, 1990; NAPA, 1994). For example, after Hurricane Hugo hit South Carolina in 1989, many people perceived FEMA as slow and inept. Senator Ernest Hollings (D-S.C.) called FEMA employees "a bunch of bureaucratic jackasses" (Rubin and Popkin, 1990: 16). Schneider (1992) also wrote:

> Hollings claimed FEMA was more concerned with regulations, forms, assessments, and inspections than with helping those in need. These statements led to the widespread perception that FEMA was ineffective, inefficient, and unresponsive (p. 139).

By creating FEMA, the Carter administration sought to improve interagency and intergovernmental coordination. Reputedly, FEMA has been unable to effectively coordinate preparedness, response, relief, and recovery efforts among various local, county, state, and federal agencies. For example, during Hurricane Hugo in South Carolina, the local emergency management agencies were essentially untrained and unprepared for such devastation, thus requiring state and federal assistance. Victims thought the federal government was primarily responsible for relief efforts, even though the response system depended on state and local guidance (Schneider, 1992: 139). Moreover, Schneider (1992) added: "Even when government follows Standard Operating Procedures (SOPs), their actions often appeared to be inappropriate for the situation at hand" (Schneider, 1992: 139-140). Subsequently, FEMA's disaster relief efforts in South Carolina were perceived as inadequate.

FEMA has faced other criticism, such as overspending while failing to prevent much death and destruction. For instance, a bipartisan task force on disaster preparedness of the House of Representatives (December 14, 1994) reported these figures:

> The cost of disasters, to the nation and to federal taxpayers, is on the rise. Since 1989, there have been nine natural disasters in the United States that caused

> losses in excess of $1 billion each. The Northridge Earthquake in 1994 claimed 61 lives and inflicted approximately $25 billion in losses. The Midwest Floods of 1993 claimed 50 lives and inflicted more than $12 billion in losses. Hurricane Andrew claimed 13 lives and inflicted nearly $25 billion in losses (p. 7).

The Congressional report (Dec. 14, 1994) also found that federal disaster assistance lacked means to encourage individuals, communities, and state governments to take precautionary actions prior to disasters (p. 1).

Federal Mitigation Initiatives (1990s)

During the early 1990s, FEMA focused on two areas of policy to reduce costs: mitigation initiatives and insurance reform. One example of federal hazard mitigation legislation is the National Earthquake Hazard Reduction Program (NEHRP) (1990), which amended the Earthquake Hazards Reduction Act (1977) (Palm, 1990: 102). This revised legislation assigned FEMA as the lead federal agency to coordinate earthquake hazards reduction activities among three federal agencies: the U.S. prediction and seismic zone assessments undertaken by the Geological Survey, basic research sponsored by the National Science Foundation, building standards development activities by National Institute of Standards and Technology (May and Williams, 1986: p. 94; NEHRP Report to Congress, 1991-92: vi). NEHRP "more clearly defined efforts to implement a full-scale and aggressive program of earthquake hazards reduction" (p. vi). NEHRP's objectives are sixfold:

1. Increase availability of information;
2. Target outreach and implementation efforts;
3. Transfer technology;
4. Enhance mitigation;
5. Conduct problem-focused geological research; and
6. Encourage community adoption of adequate building codes (NEHRP Report to Congress, 1991-1992: vi).

In addition to coordinating these federal agencies, FEMA also seeks state participation in NEHRP. In 1991, Oregon joined NEHRP with the passage of State Senate Bill 96. This statute (1) established the Oregon Seismic Safety Policy Advisory Commission; (2) required all new building sites for high occupancy facilities to be evaluated for vulnerability for seismic hazards; (3) and mandated that earthquake drills and thirty minutes of instruction on earthquake safety be conducted in schools each month (NEHRP Report to Congress, 1991-92: 61).

In addition to hazard mitigation, FEMA is also trying to reduce costs, in part, through insurance reform. Insurance is referred to as

> a redistributive method for disaster losses where the occupant who inhabits a hazardous zone joins forces with a large financial organization to spread the risk in a collective manner... It occurs commercially when an individual perceives a hazard and purchases a policy from a company which guarantees that any specified losses will be reimbursed (Smith, 1992: 76).

In effect, a policyholder may spread the cash burden from one major disaster over a number of years through the payment of an annual

premium (ibid.). Clary (1985) indicated, "In contrast to grants and loans, insurance tends to produce lower income differentials among victims and between them and society" (p. 25). However, all-hazard insurance is currently not available in many areas of the U.S. that are at high risk of disasters. As a result, property owners have become dependent on government loans and grants when their property is destroyed by a disaster. Following the Mississippi Floods of 1993, the House of Representatives Task Force Report on Dec. 14, 1994, recently recommended the creation of a private, nationally-based all-hazard insurance program, in partnership with the insurance industry (p. 9). Individuals and insurance companies would then share the costs and responsibilities so the total burden would not fall on the federal government.

Mitigation and preparedness activities have been hindered for numerous reasons other than insurance: lack of legislative and public support, turf battles with inter- and intra- governmental agencies, and restrictions on how state and local agencies can spend federal funds (May and Williams, 1986: 148). Unfortunately, the "action-forcing" agent needed to reduce these obstacles is often a catastrophe itself (May and Williams, 1986: 143).

Summary

This chapter has looked at the development of emergency management policies, and the institutions that are responsible for implementation of these policies. Disaster legislation in the United States has followed a pattern of intermittent, incremental, and reactive interest with subsequent political "quick fix" responses. The

role of the federal government in disaster policies can be traced back to the Disaster Relief Act of 1950. Since then, the federal government has increased its involvement from Civil Defense to disaster planning, preparedness, response, and recovery. Over those years, the cost of disasters to federal taxpayers has risen from about 5 percent of the total costs of disasters in the 1950s, to 90 percent or more of total public relief in the 1970s (Clary, 1985: 24). This is, in part, because the federal role has further expanded its role to include disaster benefits such as psychological counseling, tax relief, and legal advice (ibid.). Hence, the full cost of disasters to federal taxpayers has increased (U.S. House of Representatives, Dec. 14, 1994: 7).

There is a federal push for regulation and control of disasters to be augmented at the state and local level (Clary, 1985: 25). This process of devolution seeks to reassert the original intent of the Disaster Relief Act of 1950: placing the basic responsibility for disaster management on the states and their localities. Notably, some states, counties and cities have already pushed through disaster mitigation and preparedness legislation and initiatives in response to inadequate federal actions. However, one crucial question remains unanswered: How can the federal government persuade communities to accept more responsibility for pre-disaster planning and preparedness in order to prevent the worst effects and high costs of disasters?

FEMA is re-thinking its relationship with the local emergency management agencies (LEMAs). LEMAs appear to be better prepared to handle disasters than 20 years ago (Quarantelli, 1988: 6).

However, they are constrained by federal mandates, such as national security directives. Concomitantly, LEMAs have abdicated much of their responsibilities, and turned to the federal level to cover rising costs in recent years (FEMA, 1994: 1). Indeed, FEMA has reached a critical juncture. On the one hand, the federal government wants states and local entities to follow standardized plans; on the other hand, local entities have a need to create disaster programs that reflect community values, accountability, and ownership. These dynamics further complicate the planning process at the local level. FEMA has not been consistent with bolstering local interest, initiative, support, and commitment. LEMAs have been suspicious and perplexed, in a sense, because while the federal government has covered more of the costs, it has created a more troubled than productive environment for local disaster planning.

CHAPTER 4
DISASTER PLANNING AND RISK

As more people and structures crowd into hazardous zones and individual decisions confound management of disasters, planners grapple with the question: "How can we educate the public to understand hazard risks, and thus, make informed decisions for pre-disaster preparedness?" (Burby and Dalton, 1994: 229; Petak, 1985: 5). Planners acknowledge that the public perceives risk differently from experts. They are trying to bridge the gap between people's perception of risk and that of experts so that disaster planning is more effective.

Risk Assessment

Several researchers have examined risk assessment (Kates, 1978; Slovic, 1987; Hadden, 1989; Mitchell, 1989; Palm, 1990; Smith, 1992; Bolstridge, 1992; Burton, Kates and White, 1993). Risk assessment is defined as a formal method for determining the kinds and degree of risk posed by any environmental hazard (Mitchell, 1989: 190-93). It requires a probability statement of a hazardous event and the consequences. Most often, trained experts perform this technical, specialized function. Smith (1992) indicates that the objective of risk assessment "is to produce repeatable results applicable at the group level" (p. 58). Risk assessment is an explicitly scientific approach that attempts to exclude all value judgments and personal preferences, including those of the expert.

Some argue that hazard management decisions cannot be based solely on objective, statistical risk assessments. Burton, Kates and White (1993) write, "An analysis of risk needs to take into account how it is perceived by the people directly affected, individuals and organizations involved in responding to risk, as well as the perceptions of scientific and technical analysts" (p. 248). Risk means different things to different people because each person holds an unique view of their environment and of environmental risk (ibid.).

Differences in Risk Perception

Hadden (1989) writes that risk perception is influenced by "attitudes, economic situations and cultural milieus" (p. 142). Other factors that affect hazard perception include: past experiences, present attitudes, and future expectations (Smith, 1992: 60). Fischhoff et al. (1980) in their report, "How Safe is Safe Enough?," claimed that the perception of any risk "is a function of such factors as the extent to which the risk is familiar, known, voluntary, controllable, and dreaded" (p. 127). For example, when deciding where to store hazardous materials or construct a dam, public hearings are held. In these settings, experts have often concluded that the public simply cannot understand risk because they are influenced by their interests, values, emotions, and lifestyle choices (ibid.). In turn, the public challenges the technical competence of outside experts. The implications of these differences in risk perception could lead to serious complications (Kates, 1970; Palm, 1990: 16). Smith (1992) adds:

> Some risk analysts regard perceptions as invalid since they arise from emotional and other subjective influences. But, to the layperson, perceptions are the only relevant view because they incorporate the expert's analysis together with the individual judgment based on experience, social context, and other factors. The fact that this view is less "scientific" does not render it invalid. The real difficulty arises when risk analysts expect their conclusions to be accepted simply because they are as objective as possible whilst laypeople reject such interpretations simply because they ignore individual concerns and fears (p. 59).

"Many people make decisions and take actions regarding hazards based on their personal perception of the risk rather than on some objectively derived measure of the threat" (Smith, 1992: 46-47). Because of this, risk perception also has to be regarded as a valid component of risk management parallel to scientific assessments. Distinctions are frequently drawn between objective and perceived risks, largely because people perceive risks very differently from the predictions made by the more objective assessment models.

The public's perception of risk assessment is often different from that of experts. Slovic (1987) found that experts use technical ways of assessing risk, while the public tends to draw conclusions about risk intuitively, and the results are different. For instance, the study of Slovic, Fischhoff, and Lichtenstein (1980) asked three groups to rank thirty activities in order of greatest risk. They found that nuclear power topped the list for non-experts, whereas experts

ranked nuclear power 20th. The experts chose motor vehicles as the highest risk (pp. 181-216).

Disaster planning is complicated because people sometimes underestimate risk, overestimate it, or simply ignore the risk, viewing disasters as inevitable (Burton et al., 1993: 246). Moreover, Hewitt and Burton (1971) assert that people also assess natural and technological hazards differently (pp. 146-47). Planners have considered why the public perceived risks differently from the experts. Resolving all the differences between the results of technical risk analysis and subjective risk perception is a major factor in most hazard management strategies (Smith, 1992: 46-47).

Implications for Disaster Planning

Quarantelli (1985) writes that in order for people to get involved in disaster preparedness, "There should be a perceived possibility that there is a potential danger to themselves, relatives, friends, property, or symbolic objects that they value highly" (p. 2). Quarantelli (1985) also states that the public will not become actively involved in preparedness unless they recognize risks are real, directly threatening, highly possible, and could occur within a relatively short time span (pp. 2-3). Similarly, individuals tend to act if they see there is something to be gained by pre-disaster planning, such as hazard reduction.

Clearly, there is a need for better communication and ability to agree on risk between the experts and the public to improve the planning process. Some suggest that if experts could provide hazard

maps so that the public could clearly see the scientific risks, it could narrow the gap between experts and the public's perceptions of risk related to various hazards.

Hazard Mapping

Hazard maps are one tool to help the public visualize risk. Some scholars have suggested people are not interested in pre-disaster planning because they are not informed about risks in their community (Foster, 1980: 45). The development of detailed hazard maps depicting overlapping hazards and degrees of risk by geographic area could be central in educating citizens (Foster, 1980; Monmonier, 1994). Foster (1980) wrote that mapping hazard information covers several factors: the size of the region, the scale of the map, the diversity of hazards being considered, availability of information, and the techniques applied (Foster, 1980: 88). Among the benefits of preparing risk maps: the public, planners, and others are able to locate hazard risks in relation to their home, neighborhood, school or workplace (p. 43). This could increase public involvement and generate support for disaster planning.

When hazard maps are superimposed on externally-referenced maps, they show factors other than risk. They can display emergency lifelines, telecommunications, transportation networks, gas and water services, and evacuation routes. Inclusion of Geographic Information Systems (GIS) applications into the planning process could be significant in influencing citizen involvement in pre-disaster planning (Star and Estes, 1990). A GIS database would allow the storage, manipulation, and display of geographically-referenced

information. The primary goal would be to identify where approximate and estimated risks are located. However, this can be difficult to accomplish for two reasons:

1. Scientists are unable to predict exactly when, where, and how a disaster will strike. Uncertainty will always exist (Burton and Kates, 1964).
2. Many developers and government agencies have resisted hazard mapping because it is considered too costly (Foster, 1980).

Foster (1980) proposes that the benefits of hazard mapping (e.g., the saving of lives and prevention of property damage) greatly outweigh the costs involved (p. 90). In the long run, he argues, "It is cheaper to plan to avoid the effects of a disaster than to suffer from it" (ibid.).

It is important to disseminate hazard maps to the public. For instance, Portland Metro Planning Department and the Oregon Department of Geology and Mineral Industries (DOGAMI) are among the first in Oregon to have cooperatively designed relative earthquake hazard maps for the Portland metropolitan area since 1994. These maps depict areas which are more or less susceptible to liquefaction, land failure, ground motion amplification, dynamic slope instability, and structural failure. Planning has been more focused as a result of hazard mapping. These maps have been used by several emergency response agencies, emergency coordinators, land use planners, insurance companies, prospective property owners, students of natural hazards, and elected officials to help prioritize

probable risk. However, they have not yet been widely disseminated to the public.

Summary

This chapter explained previous research on risk assessment, differences in risk perceptions, and hazard mapping. Risk assessment is controversial, and adds to the complexity of disaster planning. Understanding the public's perceptions of risk and how it differs from scientific assessment has been a key determinant for planning. Studies show that people tend to get involved in pre-disaster preparedness activities when they perceive hazards are directly threatening. However, it may be difficult for people to be proactive because disaster events are uncertain. Experts acknowledge that disaster planning is difficult because it is impossible to predict exactly what physical or social events will take place. Nevertheless, they are working to more accurately assess and communicate risk to the public. One method they have started to incorporate is hazard mapping. Geographic Information Systems can be used to inform residents of potential risks in their community.

CHAPTER 5
DISASTER PLANNING MODELS

Out of the literature review of U.S. disaster planning, two distinctively different processes have become evident. The researcher has extracted central themes and patterns, and formalized two conceptual disaster planning models. They will be called the Traditional Emergency Management System (TEMS) and Community-Based Emergency Preparedness (CBEP). The latter is basically greater specification of the planning approach encouraged by FEMA Region X. This section will provide a preliminary layout for examining Benton County later in Chapter 6.

Traditional Emergency Management System (TEMS)

The current disaster planning approach for local, state, and federal levels of government is comprised of four integral parts: mitigation, preparedness, response and recovery (McLoughlin, 1985: 166; Clary, 1985: 20; Petak, 1985: 3). This planning strategy, is known as Integrated Emergency Management System, and primarily focuses on two phases: response and recovery. Because IEMS is in fact centered at the federal levels and more reliant on government experts, it will be referred to as the traditional model.

The TEMS planning approach has been plagued with intra-governmental conflicts and weak or non-existent management systems (Sylves, 1992: 303) resulting in poor disaster response, lack of interagency coordination, as well as public distrust (Petak, 1985:

4-5). Consequently, the public, planners and experts are seeking alternative planning approaches to effectively cope with disasters.

Community-Based Emergency Preparedness (CBEP)

As mentioned in the literature review, the federal government seeks to devolve responsibility back to LEMAs. Officials at FEMA Region X in Bothell, Washington, are proposing a shift from FEMA standardized disaster planning to one which focuses on greater governmental flexibility and community involvement. This is known as Community-Based Emergency Preparedness (CBEP). Community, as defined by officials in Bothell, includes "individuals, families, friends, neighbors, businesses, volunteer organizations, local government, and adjacent communities" (FEMA Region X, 1994: 1). In principle, private citizens, volunteer organizations, churches, neighborhood associations, and private businesses would work with local government agencies to develop pre-disaster planning and preparedness strategies. Furthermore, the government would share responsibility for emergency response with these private associations. For instance, community members would be trained to assist in performing critical emergency response functions. CBEP assumes better collaboration among all these groups. The concept of "community based" fosters "community-spirit" which is thought to be effective in accomplishing results that serve the unique interests of the community (ibid.).

Community involvement in pre-disaster planning would reduce the burden already placed on overwhelmed LEMAs or government authorities. Officials at FEMA Region X contend that there are many

resources, skills, expertise and capabilities that already exist within and near a community that are not fully utilized in the traditional ways of emergency planning. As a result, if communities used these local resources, they could become more self-reliant. This is significantly different from the traditional approach in that local government would not have to rely solely on government or on state and federal assistance. Consequently, the CBEP approach would improve community relations with local government officials while reducing irrecoverable disaster losses (FEMA Region X, 1994: 1).

Six Process Characteristics

This section will briefly describe each model in terms of six aspects: organizational structure, problem identification, leadership approach, citizen participation, role of experts, and outcome.

Organizational Structure

The organizational structure of the TEMS model is described as a hierarchically-arranged staff that operates amidst pre-set procedures and rules in order to closely regulate activities (Dynes, 1970: 21). Authority is centralized, which means power is focused at the national level instead of in state or local governments" (Scott and Garrison, 1995: 284). The "top-down" approach is considered elitist because few are involved in decision making.

Emergency management agencies at various levels of government prepare, plan, and respond to disasters within a complex and bureaucratic environment. This resembles Weber's (1947) classic bureaucratic model: hierarchy of authority, limited authority,

division of labor, technically competent participants, procedures for work, professionalism, rules for incumbents, and differential rewards (Schuman and Olufs, 1993: 99-102). One example of centralized, bureaucratic organizational structure is visible when FEMA requires written damage assessments before it will disburse any relief refunds (Schneider, 1992: 136). FEMA maintains this is necessary monitoring functions while LEMAs complain the "red tape" is excessive and demanding.

The TEMS approach has a formal structure, which is apparent by written rules, regulations, procedures, instructions and communications (Pugh, Hickson, Hinings and Turner, 1968: 75). State and federal laws identify the roles and responsibilities of the local level, as well as of the state and national levels. For example, if the scope of a disaster exceeds the capacities of lower governmental units, they must formally request additional assistance from the next higher level in writing (Schneider, 1992: 136).

This hierarchical arrangement is found in most disaster planning. Local officials are required by state and federal laws to produce manuals of operating procedures. However, information in these emergency plans are often not continuously updated nor easily found, they are largely unused. Moreover, local administrators are expected to complete their tasks by following specific rules, and guidelines from OEM and FEMA (Schneider, 1994; Clary, 1985).

The organizational structure of the CBEP model is more informal than the TEMS model. For instance, with CBEP, the public is included in planning meetings and public seminars. The public has more informal access to decision makers and emergency response

officials. Furthermore, coordination and collaboration are emphasized, and information is presented and shared with more people through various community networks. Hence, communities use networking to accomplish disaster planning objectives.

Problem Identification

In the past, emergency problems and the goals for planning were identified by FEMA. For instance, FEMA required local governments to concentrate on civil defense at a time when more immediate and serious natural hazards threatened communities. The federal government standardized disaster planning objectives in an attempt to provide some level of quality. For example, federal policies stressed civil defense planning when they were not appropriate policies for local conditions.

In contrast, problems are identified locally in the CBEP approach. The CBEP model allows the community to work towards three basic objectives:

> 1. Local citizens decide what the programs should be.
> 2. Local citizens establish work plans and define specific tasks to be done and the expected end products.
> 3. Local citizens decide who is responsible for the accomplishment and maintenance of each task (FEMA Region X, 1994).

Community values are considered when defining problems. This assumes that local problems are more true indicators of community need. In essence, the main difference between problem

identification in the TEMS and CBEP planning approaches is that the latter emphasizes discretionary authority at the local level, whereas the former stresses higher levels of centralization.

Leadership Approach

Leadership styles influence both behavior and attitudes in any given community. Etzioni (1965) defines leadership as "the ability, based on the personal qualities of the leader, to elicit the followers' voluntary compliance in a broad range of matters" (p. 3). In the past, emergency planners were recruited, trained and rewarded for "taking control" of disaster situations (Dynes, 1990). Typically they did not include others in disaster planning or in directing emergency response because it was faster, easier, and less threatening to do it alone.

The CBEP model calls for more "participative leadership." Filley and House (1969) describes three general classifications of participative leadership:

1. Consideration for others. The leader considers the needs and preferences of others, whom (s)he treats with dignity and kindness, and is not punitive in his/her dealings with them. Such a leader is frequently referred to as "employee-centered" as opposed to "work-centered" or "task-centered."
2. Consultative Decision Making. The leader asks his/her others for their opinion before making decisions. Such a leader is consultative, participative, or democratic (as opposed to unilateral, autocratic, or arbitrary) in his/her decision making.
3. General supervision. The leader supervises in a general rather than a close manner, delegates authority to others, and permits them freedom to exercise discretion in their

> work rather than imposing tight controls and close (frequently overbearing) supervision. (pp. 399-400).

Researchers note "better decisions and better results" as one benefit to participative leadership. For instance, the CBEP approach is considered more democratic than the TEMS approach. Clearly, citizens may become more involved in pre-disaster planning if the leadership approach is more facilitative than directive.

Citizen Involvement

How citizens are involved also influences pre-disaster planning. In the past, officials followed the 1950s-Civil Defense military model of "command and control" (Dynes, 1990: 2). Officials assumed they needed to direct helpless, irrational, and panic-stricken individuals. This model assumed that a return to "normalcy" would only be possible if there was a centrally-directed command over the chaos, and to "regain control" over the disorganization of individuals (Dynes, 1990: 5-6). Over time, this resulted in high expectations in communities for government "to bail them out" during disasters (White, 1961; Hewitt and Burton, 1971). However, government has not always been able to match the public's expectations.

In contrast, the CBEP model views people as a resource. As mentioned previously, this approach views the government official's role as facilitating rather than dominating the disaster planning process. Local agency officials share responsibility during disasters rather than claiming sole responsibility. Another aspect of the CBEP model is planners and emergency personnel have direct interaction

with interested citizens in the context of developing, reviewing, and adopting plans and proposals (Alexander, 1986: 105). Ideally, individuals, groups, interests, organizations, and community leaders would be involved to influence the outcome of disaster planning.

The TEMS model assumes the public is apathetic during "non-disaster" times. Alexander (1986) noted that "it usually takes the perception of a crisis directly affecting citizens' daily lives ... to mobilize people to invest the time, effort, and organization that will enable them to affect and change public decisions" (p. 107). In the CBEP model, it is important for citizens, planning officials, elected officials, and others to clearly understand, support and act towards achieving planning objectives to cope with disasters.

Role of Experts

The role of scientific experts in disaster planning is also important. In the past, scientific knowledge has been key to preventing and managing disasters. Experts appeared to have all the knowledge, and risk assessment was based on science. What knowledge the public possessed (be it irrational or limited) was based on their perceptions of hazard risks. Policy makers, in turn, based their decisions upon expertise, and neglected citizens' viewpoints. The TEMS model constituted a technological remedy for sustaining social order during times of natural and technological crises. Consequently, disaster bureaucracies have been organized to carry out scientific and statistical research methods on mitigation and damage prevention (Hewitt, 1983).

In contrast, in the CBEP approach, risk assessment is influenced by community values. Experts work together, rather than separately in the CBEP model. Moreover, experts' research is used by the public where and when appropriate. For example, experts provide information about general hazard location, severity, and probabilities in an understandable form. They might also translate highly technical variables into layperson's language in order for the public to participate in decision making. Experts have three specific roles for disaster planning:

1. Identify potentially significant hazards in the community.
2. Make an assessment of people and/or property at risk due to specific hazards by defining the impacted geographic areas.
3. Analyze the vulnerability of the at-risk people and property from the perspective of probable consequences if nothing is done to effectively respond to the emergency (FEMA Region X 1994 Handout; Participant Observation, Nov. 17, 1994).

With the CBEP approach, experts take community values into account when trying to communicate risks to the public. Consequently, citizens would better comprehend hazards that most likely threaten their home or workplace. Subsequently, citizens would be motivated to get involved in pre-disaster planning or other mitigation strategies.

Outcome

The outcome of TEMS and CBEP approaches differ. In the former approach, FEMA is product-oriented in that it requires Standard Operating Plans (SOPs), and a written plan. Kartez and Lindell (1987) note: "Disaster plans, by virtue of both convention and the guidelines that state and federal funding agencies have imposed, have been lengthy and dry procedural documents descended from military command models" (p. 488). These scholars also state,

> Plans perform two necessary functions: first, the production of the plan satisfies state and federal requirements for funding local disaster preparedness. Secondly, a written plan documents the allocation of emergency responsibilities and defines the legal authority under which communities can take emergency actions (Kartez and Lindell, 1987: 488-89).

However, the fact that a plan has assigned specific responsibilities does not necessarily imply that those who have been assigned the responsibilities are aware, accept, or are capable of performing their role (Kartez and Lindell, 1987: 495).

In contrast, the CBEP approach focuses on planning as a *process*. Research has shown that those emergency organizations that have gone through the planning process have been more effective in helping prevent, neutralize, weaken or mitigate the impact of disaster (Quarantelli, 1985: 5). Planning as a process entails implementing programs and activities such as mitigation, preparedness, public education, and training to build networks that work. The CBEP approach emphasizes long-term commitment with

the expectation that the plan is developmental. In essence, the planning process is continuously being reworked and revised by community members and government officials, and lives in their awareness of their respective roles.

Summary

This theoretical overview reveals differences between a traditional emergency management model and a community-based one. Table 6 summarizes both models according to the six process characteristics. These conceptual tools and idealized models provide a framework for viewing the development of disaster planning in Benton County.

Table 6: Comparing Disaster Planning Models TEMS with CBEP with Six Process Characteristics

Process Characteristics	Traditional Emergency Management System (TEMS)	Community-Based Emergency Preparedness (CBEP)	Benton County
Organizational Structure	• Hierarchical • Formal • Mandates • Rules and Regulations • Duplicated functions • Rational	• Networking • Informal • Discretionary Behavior • Shared Governance • Flexible • Decentralized	?
Problem Definition	• Uniform problems identified by FEMA and Oregon Emergency Management	• Local problems are indicators of community needs • Community values considered	?
Leadership Approach	• Top-down • Directive • Tight Control • Reactive	• Bottom-up • Facilitative • Preventive • Proactive	?
Citizen Involvement	• Officials direct public activity during disasters • Passive • High expectations of government	• Officials and others share responsibility during disasters • Build coalitions • People take responsibility for themselves • People see the benefits • Stakeholders	?
Role of experts	• Experts are central • People have minimal role • Decisions made by policy makers • Risk assessment based on science • Focus on reliance on technology • Little collaboration among experts	• Experts translate risks to public so they can understand and make decisions • Risk assessment influenced by community values • Experts work together	?
Outcome	• Product-oriented (A Plan) • "Quick-fix"	• Process-oriented (Community Development) • Long-term commitment • Continuous improvement	?

CHAPTER 6
CASE STUDY OF DISASTER PLANNING IN BENTON CO.

Introduction

Located in the heart of the Willamette Valley, Benton County was established in 1847 as the seventh county in territorial Oregon (Benton County Community Relations, 1994). It is the third smallest county in Oregon at about 677 square miles, and ranks ninth out of 36 counties in terms of population (Oregon Blue Book, 1993-94, p. 303). Table 7 shows the population increase among selected Benton County cities from 1960-1992.

Table 7: Population figures for Benton County, its Cities, and the State of Oregon (1960-1992)

Area	1960	1970	1980	1990	1992
Corvallis	20,669	35,056	40,960	44,757	45,470
Philomath	1,359	1,688	2,673	2,983	3,045
Adair Village	N/A	N/A	589	554	570
Monroe	374	443	412	448	480
Benton Co.	39,165	53,776	68,211	70,811	72,900
Oregon	1,768,687	2,091,533	2,633,156	2,842,321	2,797,000

Source: Oregon Blue Book, 1993-94, pp. 297-301.

Since 1960 Oregon has experienced a 58 percent increase in population, while Benton County has had an 86 percent increase. Corvallis has experienced a 119 percent increase in population during the last 32 years. Benton County's largest city, Corvallis is home to Oregon State University, as well as to many research and development, manufacturing, and agricultural industries. As the

population and economy of the Pacific Northwest continues to grow, more people are moving into areas that are vulnerable to hazards such as flooding, severe weather, wildland fires, hazardous materials spills, and earthquakes. Hence, the population growth of Benton County is a signal that the community needs to pay attention to emergency planning and mitigation strategies.

Background to Planning

Until 1989, disaster planning in Benton County was done by one individual, the emergency services coordinator. Like other county planners, he was trained in civil defense. Other than the coordinator, few knew what the plan contained. Planning was mostly a paper exercise wherein only one person understood what would happen during a disaster.

This situation changed in 1989 when a Benton County citizen, the Key Informant of this case study, determined to make disaster planning a higher priority in Benton County. Her interest in emergency management was triggered by news of the Loma Prieta earthquake (7.1 on the Richter scale), which violently shook the San Francisco Bay Area on Oct. 17, 1989. She began to investigate the level of disaster preparedness in Benton County. In a 1994 interview, she said:

> I've lived here long enough to know that stuff happens in this valley, and we're not really immune. So I wonder how prepared are we for disasters? I have this idea. What would happen if we called all emergency response personnel together in the community? Somebody from the fire department, police department, city and county public works, hospital, university, school district, and all

> these people who need to know what to do if we had an emergency and talked about how prepared we are (Key Informant interview, July 8, 1994).

So she presented her idea to the mayor and county commissioners. They supported her proposal to schedule a meeting with community leaders (e.g., Red Cross, OSU, private businesses, public safety, utility companies, emergency services coordinator, public works, civic and service organizations) to discuss emergency preparedness and response capability.

During these inquiries, a Corvallis fire official suggested that the Key Informant get in touch with FEMA. The Key Informant described her initial contact with FEMA:

> They (Corvallis fire officials) told me what it (FEMA) was, and gave me the number up in Seattle area .... I called them and told who I was and what I was doing .... They were really captivated to think that this homemaker was interested in doing this. So they said they had some literature they could send down and maybe even somebody from there would come to this meeting.
>
> Then an hour later I got a phone call from FEMA in Washington, D.C. The guy said, 'We're having a family protection and self-help conference next week (at the National Emergency Training Center, Emergency Management Institute in Emmitsburg, Maryland). Would you like to come back here and take part in this?' And I said, 'I'd really like to, but I can't afford to do that.' And he said, 'The taxpayers will pay for your ticket. You just have to pay for your food when you get back here, and the government owns an university campus where we'll house you in dorms.' So I said, 'I'm coming.'
>
> They were so excited about what I was doing that FEMA said they would send out a P.R. firm to video this forum (Key Informant interview, July 8, 1994)

In March of 1990, the Key Informant organized a meeting which was attended by community leaders, such as the Red Cross director, OSU safety officer, amateur radio associations, private businesses, fire and police department officials, utility companies, emergency services coordinator, public works, civic and service organizations, as well as FEMA Region X officials. An Eugene-based public relations firm filmed a segment of the meeting for a FEMA disaster preparedness video entitled "*When Disaster Strikes*" (1990). (See Appendix E for transcript of video). During the two-hour meeting, the participants shared information and ideas about emergency preparedness. They concluded that local families "need more information on how to prepare for disasters, and survive on their own" (video transcript). They decided it would take the active involvement of concerned citizens like the Key Informant to get a community awareness program up and running (video transcript). The participants decided to create a community-wide task force on citizen preparedness.

The Key Informant called the second meeting in November, 1990. She described the purpose of the meeting:

> I wanted to show the government people, emergency response (agencies) and city and county government, that it was their responsibility, and that there's a greater danger than what they really think there is (interview, July 8, 1994).

In the following months, the Key Informant tried to gather support from the Sheriff and emergency personnel leaders. She regularly arranged appointments with Benton County officials who were legally responsible for emergency management. They recognized that her commitment was serious. She said:

> I started it in January of 1991. I would go to the fire chief, to the sheriff, and to the fire chief. And the next week I'd go to the sheriff to the fire chief to the sheriff. And I did that for weeks. Finally the sheriff said,
>
> > 'You keep showing up on my schedule, on my agenda for the day. Would you please tell me what you want so that we can do it, so you'll quit just coming in here. I guess the bottom line is as far as emergency management was concerned I didn't figure it was a squeaky wheel but you've been squeaking in my ear so long. Tell me how to grease it so you'll quit doing this.'
>
> So I said I want the council organized. I want it to be a legitimate council under the direction of the county commissioners, and you need to be recognized as the head of it because emergency management is your responsibility, and we need to have people meet on a regular basis so that we can talk (Key Informant interview, July 8, 1994).

The Sheriff said he supported emergency preparedness and the Key Informant's ideas because she was committed. In April 1991, the Benton County Emergency Management Council was formed. The Sheriff appointed the Key Informant as chairperson of the Council. She has remained chairperson for the past four years. Representatives who served on that Council include emergency services personnel, Red Cross, Benton County Extension, OSU safety

officer, amateur radio associations, private businesses, fire department and law enforcement officials, public works, utility companies, elected officials, churches, school district officials, newspaper editor, civic and service organizations.

The Council was formed to discuss emergency management issues and to coordinate emergency response capabilities. However, while the Council legitimized grass-roots efforts, a major component was missing: an effective Emergency Services Coordinator who could empower and guide Benton County public, private, and volunteer groups to share responsibilities for disaster planning.

The second major development in disaster planning in Benton County occurred when a new Emergency Services Coordinator was hired in 1992. One of his first objectives was to re-write the Emergency Operations Plan (EOP) because the current plans were outdated and based on FEMA-mandated civil defense objectives. An EOP is a document that contains information on actions that local officials, disaster relief organizations, emergency personnel, and others take to protect people and property before, during, and following a disaster. It describes tasks that are carried out by specified organizational entities. These emergency tasks are typical to most disaster situations whether natural or technological hazards. The Emergency Services Coordinator described that this was not the case with Benton County's current EOP:

> The present plan is basically a civil defense plan from the '50s that in the early '80s was rewritten to be an all-hazards plan. The reality is, they took a 1950s defense plan, and they put it in a new dress. It really is not an

> all-hazards plan that I would be very comfortable with managing after an earthquake or major flood. It's designed for people in the shelters when the bomb goes off. So, we are in the process right now of rewriting the county's emergency plan and curriculum to make it a really no fooling, all-hazards plan (Emergency Services Coordinator interview, July 7, 1994).

How did Benton County go about re-writing their EOP? This case study, which began in April, 1994 after the above changes occurred, traces disaster planning activities that have taken place in Benton County during the last twelve months. However, because the process is still emerging and thus changing, the results of this case study are limited to the formation and early stages of an on-going planning process.

Steps in the Disaster Planning Process

By law, counties in Oregon are mandated to plan for disasters (Oregon Revised Statutes, 401 Series, 1993). Chapter 401, Oregon Revised Statutes (ORS 401.35) describes the authority of a county's emergency management agency:

> Each county of this state shall, and each city may, establish an emergency management agency which shall be directly responsible to the executive officer or governing body of the county or city.... Each emergency management agency shall perform emergency program management functions within the territorial limits of the county or city and may perform such functions outside the territorial limits as required under any mutual aid agreement or as authorized by the county or city (ORS 401.305; Draft copy Emergency Management Plan for Benton County, Oct. 1, 1994: iii).

Prior to starting the EOP revision, the new Emergency Services Coordinator completed two pre-planning tasks. First, he used several resources to learn about how to re-write Benton County's Emergency Operations Plan (EOP). For example, Oregon Emergency Management's Population Protection Planner assisted Benton County with formulating its EOP. Additionally, FEMA's Civil Preparedness Guide 1-8 (1990) and FEMA's Professional Development Series (PDS) class entitled, "Emergency Planning Course" provided the technical framework for planning, and recommended a multi-hazard, functional approach for developing EOP's. While attending an OEM training course in 1993, the new Emergency Services Coordinator found a new planning approach that he thought would be appropriate for revising Benton County's emergency plan. He said:

> I learned about a different approach in disaster planning known as Community-Based Emergency Management in the Fall of 1993. This approach seemed consistent with what Benton County needed because it increased disaster preparedness with public awareness. Community-based planning was not the responsibility of one person; instead many people would participate on various committees. I borrowed ideas from other sites, such as the Tennessee Emergency Management Agency and Yakima (Washington) Emergency Services. So there were available models to review, revise and use to meet Benton County's needs (July 7, 1994).

The second task the Emergency Services Coordinator completed was getting elected officials to support his efforts. He presented the county commissioners with two planning options:

> I can go downstairs in my office and write you an emergency plan, and I'll do that if you want. That can happen relatively quickly. It depends on whether or not we want to coordinate this thing with all the other county agencies and get some people to put their ink on a coordination sheet that says, 'Yes, I can do those kinds of things.' To begin with, I don't know what the capabilities of all these agencies are. It will take much longer to get a coordinated copy that we can all agree upon. But it will be my plan. It will live on the shelf down here. I'll be the only one that knows what's in it... and it will be significantly less viable than it would be if we get a lot of input and participation. Or we can take another approach, and that is what we'll do. It is what I call community-based planning. (Emergency Services Coordinator interview, July 7, 1994).

Subsequently, with the county commissioners' endorsement of the community-based approach, the Emergency Services Coordinator was able to get county department heads and agency personnel begin working towards this new approach. He drafted a letter for the chair of the board of commissioners for Benton County to send to all the elected officials and department heads. It read:

> The county is about to embark on a two-year project to totally rewrite the Benton County Emergency Operations Plan. The current plan is seriously outdated and does not adequately address several hazards that threaten the citizens of the county (earthquakes, wildland fires, and civil disorder).
>
> This planning effort will begin with a thorough analysis of the hazards that could potentially affect the Benton County area. The hazard analysis will serve as a compass to guide us in developing mitigation and preparedness strategies to counter the threat of the identified hazards. An ad hoc group working with the Emergency Coordinator, developed this analysis. The next step in the process will be to write the basic

> operations plan and the supporting annexes that describe how we will respond to disaster events. All existing plans (city, county, OSU and industry) should be reviewed and rewritten as necessary by the committees to ensure that all plans are current and fully coordinated.
>
> This project will require a cooperative effort from a broad cross-section of the community and active involvement on the part of all county departments. Representatives from city government, state and federal agencies, business, and citizen groups are also being asked to participate. I solicit your support for this project by asking you to identify an individual to serve as your jurisdiction's principal representative to the planning committee. This group will supervise the project and select the annex chiefs and committee members who will actually draft the new emergency operations plan. Please have a representative contact (the Emergency Services Coordinator)....
>
> We hope to begin the project in early January (1994) and we have scheduled an informational meeting for principal representatives .... The purpose of the meeting is to review the project schedule and discuss organizational details.
>
> I am confident that collectively we can develop a comprehensive emergency operations plan that will provide the direction and guidance necessary to allow the county and its communities to respond effectively to any emergency situation. Thank you for your support of this significant project (Letter signed by chair of board of commissioners, dated Dec. 13, 1993)

After he accomplished these two tasks, he began the formulation of Benton County's EOP. The following steps illustrate the process of planning in Benton County and examine general activities that took place:

Step 1: Assessing the Hazards

As mentioned in the county commissioner's letter above, the planning process began with reviewing and updating previous Benton County hazard analyses. The Emergency Services Coordinator updated the hazard analysis with information from local fire officials, the sheriff, and other emergency personnel experts. He primarily used FEMA's Hazard Analysis Matrix to assess hazard risks, and as a tool to rank the probability of a hazard occurring in Benton County. FEMA's standard matrix is based on four categories: prior history, vulnerability, maximum threat, and probability. The following categories are used to determine the severity or risk factor for each hazard, such as flooding, fire, or severe weather:

Severity ratings

Low	=	1 point
Medium	=	5 points
High	=	10 points

History

Low	=	0-1 event per 100 years
Medium	=	2-3 events per 100 years
High	=	4 + events per 100 years

Vulnerability

Low	=	< 1% affected
Medium	=	1-10% affected
High	=	> 10% affected

Maximum Threat

Low	=	< 5% affected
Medium	=	5-10% affected
High	=	> 25% affected

Probability

Low	=	1 chance per 100 years
Medium	=	1 chance per 50 years
High	=	1 chance per 10 years

By multiplying the "severity rating" by the factors associated with the categories above, one can arrive at a subscore for each hazard. Adding the subscore produces a total score for that hazard. The total score is not as important as how it compares with the total scores for other hazards that Benton County faces. It is not intended to predict the occurrence of a particular hazard, but rather to "quantify" the risk of one hazard compared with another.

By comparing scores, Benton County can determine hazard priorities, or relative risk (OEM, Sample Emergency Operations Plan, April 28, 1994; Participant Observation, May 18, 1994). The Emergency Services Coordinator follows an all-hazard approach, and anticipates any type or size of hazard. The current hazards analysis (1994) shows that Benton County is vulnerable to several natural and human-induced disasters. Table 8 shows twelve hazards that are currently being considered during the planning process.

Part of the hazards identification includes preparing or updating of maps, charts, and any other graphics that may be useful to assessing people's vulnerability to hazards. The researcher assisted with the development of some hazard maps with other Benton County Public Works engineers. This section will provide some maps, in addition to briefly describing twelve identified hazards that could take place in the future in Benton County.

Table 8: Benton County Hazard Analysis Matrix (1994)

Hazard	History x 2	Vulner-ability x 5	Max. x 10	Prob-ability x 7	Totals =
Severe Weather	10 x 2 =20	10 x 5 =50	10 x 10 =100	10 x 7 =70	=240
Hazardous Materials Spillage	10 x 2 =20	5 x 5 =25	10 x 10 =100	10 x 7 =70	=215
Earthquake	5 x 2 =10	10 x 5 =50	10 x 10 =100	5 x 7 =35	=195
Fire/Wildland fire	10 x 2 =20	5 x 5 =25	5 x 10 =50	10 x 7 =70	=165
Flood	10 x 2 =20	5 x 5 =25	5 x 10 =50	10 x 7 =70	=165
Utility Failure	1 x 2 =2	5 x 5 =25	10 x 10 =100	5 x 7 =35	=162
Enemy Attack	1 x 2 =2	5 x 5 =25	10 x 10 =100	1 x 7 =7	=134
Drought	5 x 2 =10	1 x 5 =5	5 x 10 =50	5 x 7 =35	=100
Civil Disorder	5 x 2 =10	5 x 5 =25	5 x 10 =50	1 x 7 =7	=92
Volcanic Ash Fallout	1 x 2 =2	1 x 5 =5	5 x 10 =50	5 x 7 =35	=92
Dam Failure	1 x 2 =2	5 x 5 =25	5 x 10 =50	1 x 7 =7	=84
Radiological Incident	1 x 2 =2	1 x 5 =5	5 x 10 =50	1 x 7 =7	=64

Source: Benton County Emergency Services, June, 1, 1994

1. Severe Weather

Each year, severe winter storms, violent wind, and other severe atmospheric disturbances, such as heavy rain, snow or ice. Severe weather may result in loss of life, property damage, crop damage, damage to homes and businesses, or power failure in Benton County (Palm, 1990: 4; Benton County Hazard Analysis, 1994: 5). Throughout history, Benton County has experienced extreme weather conditions, including ice storms, blizzards, heavy snowfall, freezing

rain, and high winds (ibid.). Most notably, the Columbus Day Storm in 1962 caused serious damage throughout the entire Willamette Valley (*Statesman Journal*, Oct. 17, 1962). Many were left without electricity, trees blocked major transportation routes, and several people were injured.

Benton County Public Works anticipates all types of weather conditions to maintain vital lifelines in Benton County. They have adopted a "Snow and Ice Priority Plan" (See Plate 1). For example, during the snow storm in February 1995, Benton County Public Works first sanded roads shown in red. In addition, many schools and businesses have pre-established procedures in the event of severe weather.

2. Hazardous Materials Spillage

In Benton County, a hazardous materials accident could take place in an existing public or private fixed facility, or portable structure, such as a railway or highway, resulting in serious, long-term contamination which may irreversibly alter the environment. Hadden (1989) presented several factors that result in various levels of danger by hazardous materials: exposure, length, route, amount, and toxic or hazardous characteristics (p. 6). For instance, hazardous effects may be short-term, or acute, and long-term, or delayed. Among short-term hazards are explositivity and flammability. In contrast, long-term or delayed hazards are more difficult to identify because their effects are delayed (Hadden, 1989, pp. 6-7).

According to the Oregon Environmental Atlas (1988), "In the past, business and government disposed of hazardous materials in

ways we now know were inadequate to fully protect public health, safety, and the environment" (p. 34). As a result, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act, also known as "Superfund" in 1980 (ibid.). Under the Superfund program, the Environmental Protection Agency (EPA) has established a priority list of sites that need remedial action (pp. 34-35). Oregon has five Superfund sites, including one in Corvallis at the former United Chrome site (ibid.). There are several locations where hazardous materials are manufactured, used, and/or stored in Benton County. Specific sites have been identified in Table 9 as high risk because significant

Table 9: Location and Type of Hazardous Materials in Corvallis

Location	Type of chemical
Oregon State University (Gilbert Hall, Cordley Hall, Weniger Hall, Physical Plant, Nash Hall, Animal Lab, Langton, & Women's Building)	Chlorine; Toxic chemicals; Biohazards
Benton Co. Sewage Treatment Plant	Chlorine
Hewlett-Packard	Toxic gases, Flammable materials, Corrosives
Evanite Fiber Corp.	Toxic gases; propane
Benton Co. Public Works	Flammable materials
Western Pulp Products	Toxic chemicals
Taylor Water Treatment Plant	Chlorine
Osborn Aquatic Center	Chlorine
Oberson's Oil Inc.	Flammable liquid
Middleton Heating	Flammable gas
Farrell Gas	Bulk propane
Bertea/Aviation Inc.	Flammable gas
Corvallis High School	Chlorine
Highway Vision	Above ground fuel tanks
McNesby & Aubry	Above ground fuel tanks
Pepsi-Cola Bottling Co.	Chlorine
Antivirals Inc.	Chloroform; Biohazards

Source: Oregon State Fire Marshal's Handbook on Hazardous Materials, 1993

quantities of chemicals are stored there. (See Plate 2).

Large quantities of hazardous materials (gasoline and liquid natural gas) move by truck or by rail through Benton County. Many trucks carry hazardous materials on highways 20, 34, and 99 West each day (See Plate 2). According to an Oregon Public Utility Commissioner official, only 36 accidents involving trucks carrying hazardous materials occurred in 1994, out of about 1,300 trucking accidents statewide (*Oregonian*, Jan. 26, 1995, C1, C5).

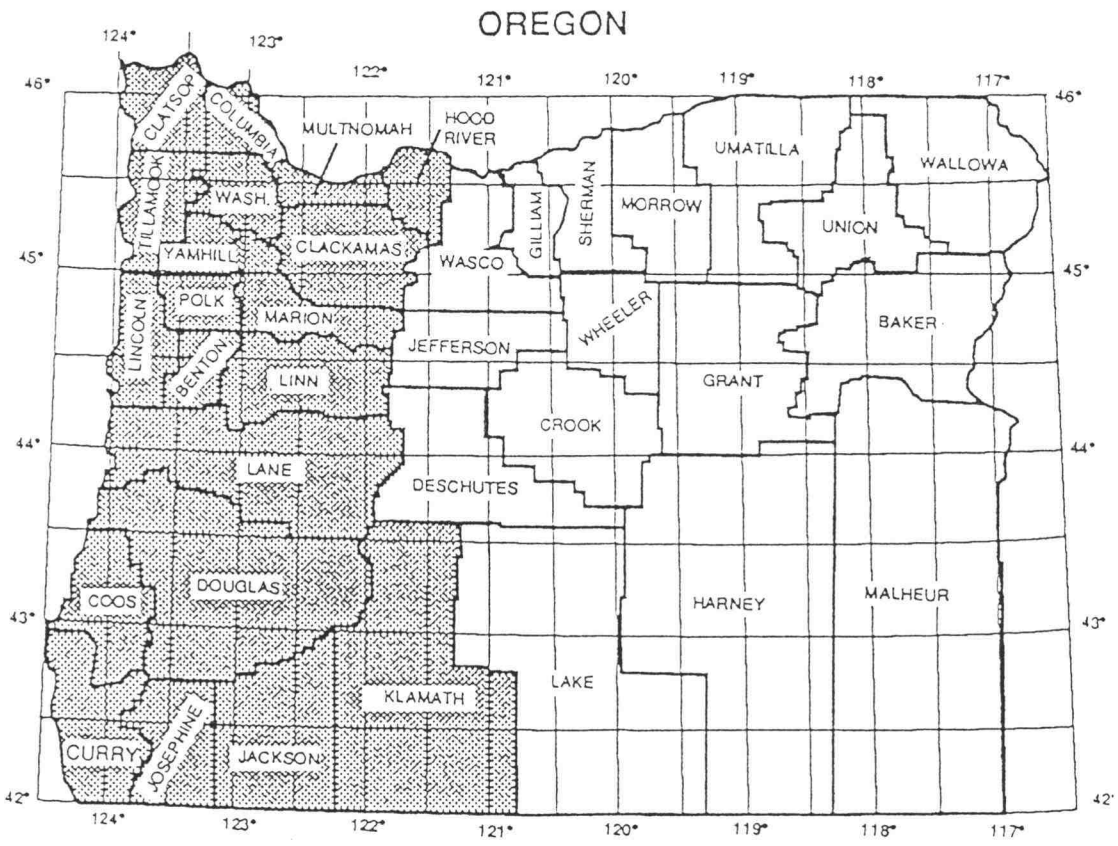
3. Earthquakes

According to a seismologist/geologist at FEMA Region X, a recent seismic risk map for the state of Oregon shows that areas west of the Cascade Mountain Range, including Benton County, lie in Zone 3 (See Figure 1). Both the Scotts Mills and Klamath Falls earthquakes, which took place in 1993, were considered "wake up calls" to Oregonians. The Emergency Services Coordinator and Key Informant have stressed the importance of preparing for earthquakes since there may be more seismic activity in the future.

Oregon is vulnerable to three types of earthquakes: crustal, interplate, and subduction zone (Madin and Mabey, 1993). Crustal earthquakes occur along active faults which may be visible from the surface. Interplate earthquakes, such as the Puget Sound earthquake in 1949, could reach a magnitude 7.4 on the Richter scale (ibid.).

Scientists at the Oregon Department of Geology and Mineral Industries (DOGAMI) have focused their research on the Cascadia Subduction Zone, which lies about 50 miles offshore and extends

Figure 1: Seismic Risk Map of Oregon (Uniform Building Codes Agency, 1994)



SEISMIC ZONE 2
SEISMIC ZONE 3

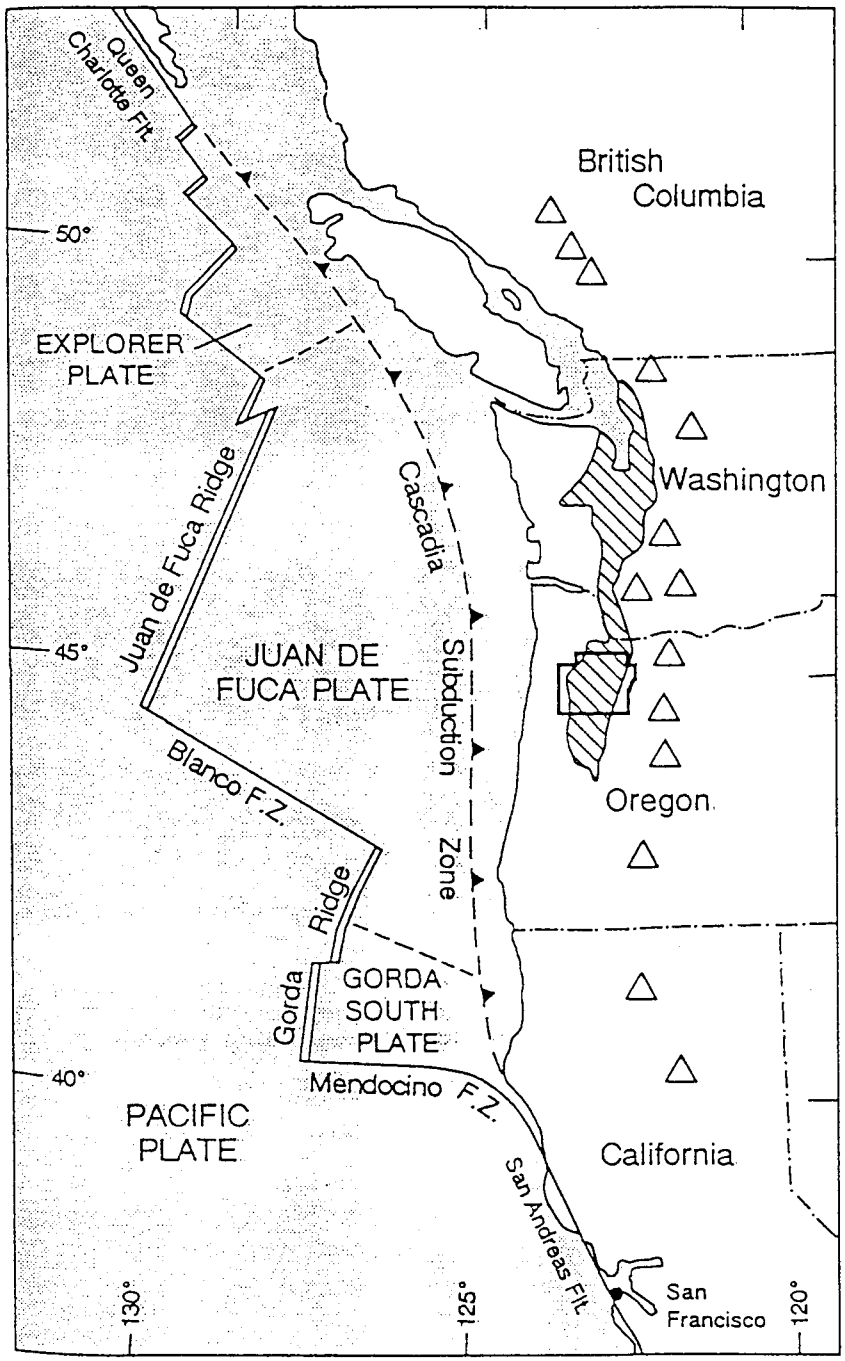
SEISMIC ZONE MAP OF OREGON

from the middle of Vancouver Island, B.C., past Washington and Oregon to Northern California (See Figure 2). This is where the Juan de Fuca Plate is moving away from the Pacific Plate and towards the North American Plate. Where they meet, the Juan de Fuca Plate is thrust beneath the North American Plate (subducted) along a great fault called the Cascadia Subduction Zone (DOGAMI report, 1994).

Carbon-14 dates from Oregon coastal marshlands indicate a subduction zone earthquake (magnitude 8 or greater) and subsequent tsunamis inundated low-lying coastal areas about 300 years ago (Madin, 1993). Geoscientists estimated subduction zone earthquakes take place every 300 to 600 years (ibid.). Although it is uncertain when this could take place, experts are gearing up for a subduction zone quake that could severely affect the entire Pacific Northwest. Planners anticipate that earthquakes would cause many fatalities and disrupt critical lifelines (communication, transportation, and public utilities). In addition, earthquakes might trigger other hazards, such as fires, floods, dam failures, and hazardous materials spills (Benton County Hazards Analysis, 1994: 3).

The amount of earthquake damage in Benton County as elsewhere depends upon several factors: distance from epicenter, local soil conditions, and types of construction. Buildings of all types that are located on steep soil slopes may be at risk due to landslides triggered by an earthquake. Buildings constructed on liquefiable soil (water-saturated loose sand or silt typically found in floodplain, beach, or sandspit) may also be damaged when the soil loses its strength during an earthquake (DOGAMI report, 1994). In Benton

Figure 2: Cascadia Subduction Zone Map (Goldfinger, 1990)



Tectonic map of the Pacific Northwest after Riddihough (1984). Willamette-Puget lowland corresponds to the hatched pattern (Niem and Niem, 1984). The location of the study area is outlined. Major stratovolcanoes are shown by open triangles.

County, an engineering study would need to be done to determine such locations along the Willamette River

It is important to note that earthquakes occurring near Portland, off the Oregon coast, or in the Puget Sound, Washington, areas may affect Benton County, too. Table 10 shows the list of Pacific Northwest tremors that have been felt in Benton County. Previous seismic activity indicates perhaps more earthquakes may occur in the future.

Plate 3 shows the geologic features of Benton County. Bela et al. (1979) mapped several faults, including the Corvallis Fault, which runs through the northeast corner of Benton County near major concentrations of population (Goldfinger, 1990). Measuring 34 miles in length, it is thought to be the longest in the Willamette Valley. This fault separates the older and upthrown Siletz River Volcanics (Tsr) from the younger and downthrown middle and later Eocene sandstone (Tf and Ts). Since no Quaternary units (Qral, Qtl, Qtm, Qth) have been displaced, field evidence suggests that surface faults are inactive. However, more studies are needed, and might alter current perspective of active faulting within the Willamette Valley and Coast Range (Geologic Hazards of Eastern Benton County, 1979).

Table 10: Selected Summary of Earthquakes felt in Benton Co. (1891-1993)

Date	Epicenter	Mercalli intensity (Richter magnitude)	Mercalli intensity in Benton Co.	Comments
9/16/1891	Salem	IV	–	Brief, distinct shock followed by wavelike motion; windows rattled.
4/2/1896	McMinnville	VI	–	People awakened; 2-3 shocks with loud rumbling noise from west.
2/25/1921	Cascadia	V	–	Felt by nearly all in 6-by-12-mile area.
7/18/1930	Perrydale	VI	–	Cracked plaster, rattled windows near Perrydale.
5/12/1942	Corvallis	V	V	Local shock, strongly felt.
4/13/1949	Puget Sound, Washington	VIII (7.1)	VI (Corvallis)	Largest earthquake of record in Pacific NW; felt over 150,000 sq. mile area.
11/4/1953	About 100 mi off Oregon coast	–	III (Corvallis)	Short but sharp tremor
12/15/1953	Portland	VI	–	Salem, light vibration I-III; not felt in Albany or Corvallis.
3/22/1957	Alsea	III	–	Two light tremors reported 4 hr. After principal shock (mag. 5.3, intensity VII) hit San Francisco; tremors felt while aftershocks in S.F. still occurring
11/16/1957	Coast Range (Tillamook-Portland)	VI (Salem)	IV (Corvallis)	One of the largest documented earthquakes for Coast Range; reported not felt in Albany or Monroe.
8/18/1961	East of Salem	VI (Albany and Lebanon)	IV (Corvallis)	Plaster cracks at some Albany residences; felt over NW Oregon.
11/5/1962	Portland-Vancouver	VI (5.0)	IV (Corvallis, Philomath, and Alsea)	New seismic stations in Pacific NW in place which provided first significant data to construct travel-time curves for Oregon; felt over 20,000 sq. miles
3/7/1963	Coast Range (Tillamook-Salem)	V (West Salem) (4.6)	IV (Corvallis)	One of the largest documented earthquakes for Coast Range; minor quake felt from Portland-Eugene
4/29/1965	Puget Sound, Washington	VII-VIII (6.5)	V (Corvallis Philomath)	Second largest earthquake of record in Pacific NW; Portland intensity V; not felt in Alsea, Wren or Albany.
3/25/1993	Scotts Mills	IV-VI (5.6)	–	–

Sources: Bela et al. (1979); Berg and Baker (1963); Couch and Lowell (1971); Coffman and von Hake (1973); Bodle (1946); Coast and Geodetic Survey (1945-1966).

4. Fire/Wildland Fire

Another potential hazard in Benton County is fire/wildland fire, which involves "uncontrolled burning in residential, commercial, industrial, rural, and unincorporated areas of structures or wild lands" (Benton County Hazard Analysis, 1994: 4). Urban fire occurrences are also common within the incorporated areas of the County. There is also a threat of wildland/urban interface fires from areas of undeveloped property adjacent to urban centers.

The Oregon State Department of Forestry (ODF) conducted a fire hazard risk survey in 1991. ODF developed an analysis of daily fire danger rating indices in their area of protection, which is mainly the western half of Benton County, excluding National Forest and Research forest areas and urban centers (OAR 629-47-025). Plate 4 shows the high, and extreme high risk areas in ODF's jurisdiction. How forest fires establish themselves, how they develop, and whether they get out of hand, depends largely upon the following factors: fire protection; fire weather conditions; topography; slope gradient; and vegetative fuels loads (Ebert, 1988: 154). In most cases, it is the combined interaction of these hazard factors that creates the specific dynamic characteristic of each fire (ibid.).

For Benton County, other government agencies are responsible for fire protection. For instance, the Bureau of Land Management (BLM) contracts out its fire protection services to ODF. ODF also shares responsibility with eleven Rural Fire Protection Districts (RFPD) in Benton County: Hoskins-Kings Valley RFPD; Blodgett RFPD; Alsea RFPD; Philomath RFPD; Adair RFPD; Palestine RFPD; North

Albany RFPD; Corvallis RFPD; Monroe RFPD; Pedee RFPD; and Polk Co. No. 1 RFPD.

Rural fire protection districts, which are mainly staffed by volunteers, work to reduce fire dangers by individual mitigation efforts. For instance, Corvallis Fire Department went door-to-door in the high risk area of Vineyard Mountain in August, 1994 (Corvallis Fire Marshall interview, Sept. 1994). Residents were educated about fire prevention strategies, such as planting fire-resistant vegetation around existing structures. Some insurance companies also require homeowners to "fire-proof" structures. The county also has guidelines for specific road widths and turn-arounds for fire engines and water tankers so that they can provide services during a fire.

5. Flood

The National Flood Insurance Program began when legislation was passed in 1968 in response to the mounting loss of life and property due to flooding in the United States (Rossi, Wright and Weber-Burdin, 1982, p. 137). The program enabled property owners to purchase government-subsidized flood insurance. Residents in eligible communities may also insure their personal property against flood loss. It also discouraged unwise use of flood-prone lands. Thus, subsidized insurance is available to communities that adopt and enforce certain floodplain management regulations (Rossi et al., 1982: 138).

Benton County takes advantage of this program since much of the Willamette Valley is located on floodplain and former wetland areas, resulting in occasional regional and local flooding (Benton

County Hazard Analysis, 1994, p. 4). Inland flooding is most commonly caused by the overflow of streams (Palm, 1990, pp. 11-12). This type of flooding, sometimes called riverine flooding, is brought about by heavy rainfall, rapid snowmelt, the constriction of channels (log, ice, or debris jams producing a backup of water upstream), dam failure, or some disturbance in the watershed (Griggs and Gilchrist, 1983). Furthermore, overflow of storm sewer systems due to drainage system failure following heavy rain and rapid snow melt may cause flooding (Benton County Hazard Analysis, 1994, p. 4). Historically, there has been periodic overflow of the Willamette and Marys rivers. One prominent flood, which took place in 1977, inundated much of the Willamette Valley following heavy rains and rapid snow melt (ibid.).

Areas particularly at risk from riverine flooding are defined by planners as floodplains, usually delineated in accordance with the National Flood Insurance Administration program as areas with a 1.0 percent probability of being inundated in any given year (Palm, 1990, p. 11). Floodplains are those areas which are most susceptible to flooding from nearby streams. Plate 5 identifies floodplains and floodways along streams and rivers in Benton County. FEMA forecasts the 100-year flood on the basis of historical information and rainfall, as well as detailed analysis of flooding patterns in each community (FEMA Flood Insurance Study of Benton County, Aug. 5, 1986).

6. Utility Failure

Basic power services, such as electricity, gas, water, and communications, are important lifelines. Utility failure is defined as "interruption or loss of electrical and/or natural gas service or other critical utilities for an extended period of time" (Benton County Hazard Analysis, 1994, p. 5). According to an utility spokesperson for Central Oregon, "over the last couple of years, there has not been a major power failure for this area" (Interview, March 29, 1995). Other than feeder outages, there have been few difficulties (ibid.). The last major outage occurred during the Columbus Day Storm in 1962 (ibid.). Plate 6, which was created by Benton County Public Works, shows the areas where five utility services operate in Benton County: Consumer Power Inc.; Pacific, Power and Light; Monroe Telephone; Pioneer; and US West.

7. Enemy Attack

National defense policy recognizes the possibility of an attack on the United States with conventional, biological or chemical weapons (Benton County Hazard Analysis, 1994, p. 3). It does, however, accept that the threat of nuclear attack has diminished greatly in recent years and is no longer considered the primary threat (ibid.) The absence of military facilities or high value targets in the County significantly reduces the probability of this threat. No map was developed for this hazard because the risk for enemy attack could not be determined.

8. Drought

Benton County has experienced mild problems with drought conditions. Negative impacts of a drought are threefold: they threaten the availability of drinking water and fire suppression resources, and also severely damage the water-dependent agricultural and other industries in Benton County (Benton County Hazard Analysis, 1994: 2-3). In 1992, thirty-two counties in Oregon (including Benton County) were declared a disaster area because of continuing drought conditions (ibid.). An U.S. Soil Conservation Service report (September, 1994), concluding that Benton County's rating for drought was mild, whereas the southeastern and central counties in Oregon were extreme risk to drought conditions. However, drought continues to be a potential hazard in Benton County.

9. Civil Disorder

Civil disorder, which is defined as "any incident with the intent of disrupting a community to the degree that police intervention is required to maintain public safety... and includes riot, protests, demonstrations, strikes, and acts of terrorism" (Benton County Hazard Analysis, 1994, p. 3). While there is no record of major occurrences of civil disorder in the county, several Oregon State University student parties and snowball fights have disrupted neighborhoods in and around the university for short periods of time. There have been a few political demonstrations over the years requiring policing above and beyond the normal day-to-day staffing (ibid.). No map was created for this hazard.

10. Volcanic Ash Fallout

Benton County is situated near the Cascade Mountain range. Several dormant volcanoes could possibly erupt in the future. Scientists have been studying Mount Hood and Mount St. Helens in the north, as well as the Three Sisters, Mount Bachelor, and Newberry Crater areas in the east. Volcanic ash fallout would be the only adverse effect that would affect this area. This depends on several characteristics, such as height of eruption column, atmospheric conditions, and prevailing wind direction (Benton County Hazard Analysis, 1994: 5-6). No map was created for this hazard.

11. Dam Failure

Since Benton County is located downstream from six dams in Lane County (Hills Creek, Lookout Point, Dexter, Cougar, Fall Creek, and Fern Ridge), dam failure could cause sudden catastrophic flooding here. The most extensive inundation would occur if Hills Creek Dam were to fail, as the resulting flood waters would breach Lookout Point and Dexter Dams, and then continue down the Willamette River and cause flooding in portions of the surrounding countryside in Benton County. Most likely, the U.S. Army Corps of Engineers would be able to provide advanced warning as the water approaches, usually 8 to 11 hours for the Monroe area, depending on the dams under stress (Benton County Hazard Analysis, 1994, p. 2). Army Corps of Engineers Flood Inundation maps (1987) are available for each dam.

12. Radiological Incident

The final type of hazard that poses a threat in Benton County is a radiological incident, either located at a fixed site, or during transportation. In 1994, nine organizations were given licenses for storing radioactive materials on sites throughout the county (See Table 11).

Table 11: List of Radiological Material Licensees in Benton County (1994)

Location	Purpose
Oregon State University	Broad scope A
Good Samaritan Hospital	Medical diagnosis/therapy
Benton Co. Public Works	Industrial gauge
Antivirals, Inc.	Research and development
CH2M Hill, Inc.	Gas chromator
Evanite Fiber Corp.	Fixed gauge; gas chromator
Foundation Engineering	Industrial gauge
Morse Brothers Inc.	Industrial gauge
NCASI	Gas chromator

Source: Oregon State Health Division (March 31, 1994)

Oregon State University is the site of a small nuclear reactor that is used for "research, education, and scientific experiments" (Benton County Hazard Analysis, 1994, p. 5). (See Plate 2). According to the Emergency Services Coordinator, "Due to the design of the facility and the small amount of radiological material on site, the reactor is not considered a significant hazard" (ibid.). Should an emergency develop, only the immediate area inside the reactor facility would likely be affected (ibid.). In addition, the Department of Energy requires that Oregon State University's Office of

Radiological Safety maintain and exercise an emergency response plan for this facility. Other facilities, such as Good Samaritan Hospital (Corvallis) primarily used radiological materials for testing equipment and radio-pharmaceuticals.

Benton County has determined high risk areas hazard locations as accurately as possible. However, this is difficult to accomplish without more specific engineering studies. This hazard analysis specifies twelve threats for which the EOP will outline the who, what, where, and how to coordinate an effective response during a disaster.

Step 2: Formulating Basic Plan

After determining the hazard analysis, the next major step was to create a basic plan and divide various emergency functions and services. The Emergency Services Coordinator himself researched background information about the County, neighboring jurisdictions, and legal statutes, in addition to reviewing the existing EOP. He wrote a draft copy of the basic plan, which is a relatively brief statement of legal authority providing the basis for the plan. It indicates the missions, concepts, and policies governing operations which a community confronts during a disaster (CPG 1-8, April 1982, p. 6; Draft copy of Benton County Basic Plan, October, 1, 1994). The Basic Plan serves as an outline for developing Standard Operating Procedures (SOPs), which are based on contingency planning. Public safety officials and other planning participants realize that they cannot fully anticipate all circumstances of a disaster; contingency plans help them think about all the "what ifs" before a disaster strikes. For example, the Emergency Services Coordinator has

anticipated that telephone lines will be out of service, or heavily taxed during an emergency. Consequently, there is a communications planning committee, which is made up of people with knowledge of alternative modes of communication, such as volunteers who specialize in ham radio operations, and representatives from the cellular phone industry. They have discussed various options for maintaining these vital communication lifelines to ensure an effective response during disasters. Hence, SOPs are intended to be a planning tool to be used before and during disaster operations (CPG 1-8, Sept. 10, 1990, p. 2-7).

While the basic plan provides information relevant to the EOP as a whole, special expanded sections of the plan called functional annexes emphasize responsibilities, tasks, procedures, and operational actions that pertain to the function being covered. Planning committees are required to formulate functional annexes, which are key components of the EOP that define specific tasks and indicate who is responsible for carrying out those tasks.

At a January 1994 planning meeting with functional annex chiefs, the Emergency Services Coordinator formed planning committees to assist him in writing twenty-two functional annexes. His agenda included explaining the roles and responsibilities of the principal participants, especially the elected officials. Annex chiefs were appointed to head up each of the committees responsible for re-writing that functional annex. For instance, Benton County's sheriff was chosen to chair the law enforcement functional annexes based on his position, legal authority, expertise, and qualifications.

Next, participants signed up to be on a specific functional annex to improve coordination of the EOP during a disaster. Individuals from various city, county, and state agencies, volunteer organizations, private businesses, medical services groups, OSU and school district officials, media representatives, and others now serve on functional annexes according to their experience and interest (See Table 12 for list of functional annexes and committee assignments). For instance, the American Red Cross is responsible for identifying shelters available to the community during disasters. Therefore, it is logical for the Linn-Benton Red Cross chapter director to be the annex chief of the Shelter, Reception, and Mass Care Functional Annex. Other members on that committee include representatives from the Salvation Army, Oregon State University, School District, Corvallis Parks and Recreation, Humane Society, and Community Services Consortium. Their task was to formulate a plan outlining how they will set up a shelter. It was often difficult to agree on the procedures for informing the public on shelter locations, in addition to preparing shelters with necessary resources to maintain an effective shelter. However, working these procedures out in advance, as well as identifying who was responsible for those tasks, will improve response capabilities during a disaster.

After planning committees were organized for the functional annex formulation, the Emergency Services Coordinator recommended that they follow a particular format to complete their section of the EOP. He also provided committees with planning materials, such as sample plans from other counties. For instance,

Table 12: Functional Annex and Planning Committee Assignments

Annex	Committee Members
Basic Plan	Co. Emergency Management; Emergency Coordinators in Corvallis and Albany; Benton Co. Fire Defense Board (BCFDB); Benton County Emergency Management Council; Valley Echo CAER Group
Hazard Analysis	Co. Emergency Management; Corvallis Fire Dept., County Commissioner; Sheriff; County Public Works, Albany Fire Dept.
Communi-cations	Corvallis Police 9-1-1; Sheriff's Office; Amateur Radio Emergency Services; Corvallis Public Works; (BCFDB); US West/Cellular One representatives; Clackamas Communications
Direction & Control	Sheriff; Corvallis Police; Albany and Corvallis Emergency Coordinators; County Emergency Services
Warning	Emergency Services; Sheriff's Office; Albany and Corvallis Emergency Coordinators; KOAC Engineer; School District representative; OSU
Emergency Public In-formation	County Community Relations; Corvallis, Philomath and Albany Public Information Officers (PIO); Electronic and Print Media representatives; Media representative; OSU
Evacuation	Sheriff; Corvallis, Philomath, and Albany Police; Oregon Dept. of Transportation; Oregon State Police; Transportation Annex chief; Hewlett-Packard
Shelter, Reception & Mass Care	American Red Cross; Salvation Army; OSU; school district representatives; Corvallis Parks & Recreation; Humane Society; Community Services Consortium
Health & Medical	County Health Dept.; Good Samaritan Hospital; Corvallis and Albany fire dept.; Funeral directors representatives; OSU Student Health Center
Law Enforcement	Sheriff; Corvallis, Philomath, and Albany Police; Oregon State Police; Oregon State Forestry; Siuslaw National Forest; District Attorney
Public Works	County Public Works; Corvallis, Philomath, Monroe, Albany, and Adair Village public works; OSU Physical Plant; Corvallis Disposal
Fire/Rescue	Corvallis Fire Chief; BCFDB; Dept. of Forestry; Corvallis Mountain Rescue
Radiological Protection	Emergency Services; OSU Radiation Center; HAZMAT Team for Linn-Benton-Lane Counties; County Health Dept.; Corvallis/Albany emergency coordinators
Human Services	Community Services Consortium; County Mental Health; school district representatives; OSU; United Way; Council on Government; Educational Service District; Clergy representatives
Resource Management	County Public Works; County Finance Director; BCFDB; Corvallis, Albany, Philomath public works; Oregon National Guard; County Personnel Director; Morse Bros. Inc.; Corvallis Disposal
Damage Assessment	County Assessor; Albany & Corvallis building dept.; Red Cross; Albany, Philomath & Corvallis public works; Benton Co. Public Works; ODOT
Legal	County Counsel; Corvallis, Albany, and Philomath City Attorneys
Hazard Mitigation	Emergency Services; Corvallis and Albany Emergency Coordinators; Red Cross; school district representative; OSU; Valley CAER Group
Trans-portation	Corvallis Transit System Manager; Mayflower Bus Co., Albany Transit System; Dial-A-Bus; OSU Motor Pool; Olson Bus Co.; Crowson Bus Co.
Training & Exercises	Emergency Services; Corvallis and Albany Emergency Coordinators; Red Cross; Benton Co. Emergency Management Council (BCEMC)
Recovery	Emergency Management; Corvallis, Albany Emergency Management; BCEMC; Valley Echo CAER Group; Benton Co. Agent of Record; County Health Dept.; County Development Dept.; Utility and Building Dept.; Corvallis Homebuilders

Source: Benton County Emergency Services, 1994

each annex chief received a folder containing materials planning committee roster, and a former EOP (on paper and computer disk). He also encouraged the committees to conduct additional research in order to make the annex more comprehensive (Emergency Services Coordinator's letter to the County Counsel, Jan. 25, 1994). Tasks were divided among participants, and the Emergency Coordinator requested that annex committees keep him informed of their progress. He said he would be available if they needed additional assistance. He gave the planning committees 60 days to complete the initial draft. Other guidelines were specified in a letter of instructions to annex chiefs (Jan. 21, 1994):

1. To ensure that all plans are current and fully coordinated, existing plans should be reviewed by the committee. If inconsistencies exist, they should be identified and resolved with the person responsible for that plan. If differences can't be resolved, contact the Emergency Coordinator.
2. You are free to consult additional sources or add to your committee as necessary to accomplish your task.
3. The draft document should be submitted to the Office of Emergency Management in hard copy for the first review, and in both hard copy and on disk for the final review. The draft document should be prepared in a DOS format on Word or WordPerfect.
4. Remember, this is primarily a "who" document; it assigns responsibility to various departments or organizations for a particular function. The details of "how" something will be done, belong in the Standard Operating Procedures for the department or organization that has responsibility for that function under the plan. It is not necessary to repeat procedures in the County plan that currently exist in another plan, simply provide a brief summation and reference the plan that contains the procedures.

5. Please save the background materials and return them when the project is complete (letter to functional annex chief, Jan. 21, 1994).

In addition to making himself available to planning committees, the Emergency Services Coordinator has maintained dialogue with planning committee participants to improve each functional annex. For instance, he met with public works officials from the City of Corvallis, City of Philomath, and Benton County Public Works to refine their annex (interview, Benton County Public Works representative, May 26, 1995). In this case, several drafts were circulated among committee members until it was satisfactory (ibid.). Planning committees and the Emergency Services Coordinator reviewed annexes and worked to make further improvements. Then, the Emergency Services Coordinator facilitated joint meetings of various subcommittees for different functions to make sure that participants had a good understanding of their tasks.

Step 3: Coordinating Plan

In addition to meeting informally with the planning committees to facilitate re-writing functional annexes, the Emergency Services Coordinator has encouraged more participation. However, he said this has been difficult and time-consuming to include more people in this process. He continuously contacted several annex chiefs to review progress and assist with organizational problems. In fact, the Emergency Services Coordinator noted that they are behind on their pre-arranged timeline. As of April, 1995, only a few of the annexes have been completed or drafted. One annex (Hazard

Analysis) has been formally approved by OEM; two annexes (Basic Plan and Legal) are completed, but are waiting to be submitted to OEM as an entire document with the 22 functional annexes; five annexes (Direction and Control, Emergency Information, Public Works, Radiological Protection, and Legal) have been drafted, but are waiting to be coordinated among various committee members; six annexes (Communication, Fire and Rescue, Evacuation, Human Services, Shelter, Reception, and Mass Care, and Health and Medical) are in the process of writing a draft; and eight annexes (Warning, Law Enforcement, Resource Management, Damage Assessment, Hazard Mitigation, Transportation, Training and Exercises, and Recovery) have not been started. The Emergency Services Coordinator said he did not anticipate that the process would take this long (interview, April 27, 1995). Eventually, functional annexes will be reviewed and coordinated with other annexes by an oversight committee, he said (ibid.).

The Emergency Services Coordinator attributed the delay in completing the functional annexes to one key reason: planning participants have taken on emergency planning tasks as an added-on responsibility. Often, they are unable to make adequate time for formulating disaster plans when they have to attend to day-to-day responsibilities. Thus, it difficult to coordinate all the various planning participants.

The Emergency Coordinator noted that the Council, headed by the Key Informant, has been effective for motivating and informing planning participants. During regularly scheduled meetings, planning participants were reminded of how vital their involvement is in the

planning process. The Emergency Services Coordinator described the Council as a "vehicle" to accomplish disaster planning tasks. He also cited the Key Informant's role in this process. This citizen has been instrumental in keeping emergency preparedness on leaders' agendas. For instance, she has met with county commissioners, the sheriff, and Emergency Services Coordinator, as well as planning participants during bi-monthly Council meetings. Subsequently, both the Coordinator and the Key Informant have realized the importance of maintaining the support of the county commissioners, the sheriff, mayors, and various local agency department heads. Yet, several have attended Council meetings only occasionally. The Emergency Services Coordinator continued to contact county commissioners, sheriff, mayors, department leaders in meetings and through memos to maintain communication and exchange ideas. He has discussed the progress of his planning approach, and said he was concerned that without their support, the planning committees lacked accountability. Getting the commitment of elected officials and other community leaders is a difficult, yet an essential aspect of disaster planning to promote inter-agency coordination and cooperation.

After the functional annexes have been completed and coordinated, the Emergency Services Coordinator anticipates the next step is to write seven hazard specific annexes for flood, winter storm, hazardous materials spills, earthquake, wildland fire, civil disorder, and nuclear attack (Benton County EOP's Rewrite Timeline, 1994). Benton County has not started this task. When the functional and hazard specific annexes are completed, the Emergency Services Coordinator said that a final EOP draft will be produced, and then

given to all planning team members, such as other local governments, planning councils, FEMA regional office, private disaster relief organizations. Copies will be submitted to reviewing authorities and to other organizations to ensure an effective coordination during disasters. A final planning meeting will be held to discuss any further required changes. Decisions will be made for presenting the EOP and deciding how to implement it. As mentioned previously, bringing the EOP together is a complicated task since individuals may be aware of his/her own role during a disaster, yet may not be certain of others' roles. Indeed, sharing information in the EOP is critical for supporting preparedness for joint operations in large-scale disasters affecting multiple jurisdictions. By dividing the tasks among various planning committees, the Emergency Services Coordinator tried to stimulate interest and obtain community support for the EOP. At this point, the Emergency Services Coordinator has been trying to figure out an effective way to involve various public, private, and volunteer organizations in coordinating the new EOP.

Step 4: Exercising Plan

Oregon Emergency Management requires counties to participate in drills each year. This is one way to know if a community and its planning participants are ready for disaster without a disaster actually occurring. There are three types of exercises:

1. Tabletop exercise: An activity in which elected and appointed officials and key agency staff are presented

with a simulated emergency situation without time constraints. It is usually informal... and designed to elicit constructive discussion by the participants as they attempt to examine and then resolve problems. The purpose is for participants to evaluate plans and procedures and to resolves questions of coordination and assignment of responsibilities in a non-threatening format and under minimum stress.

2. Functional Exercise: An activity designed to test or evaluate the capability of an individual function or complex activity within a function. It is applicable where the activity is capable of being evaluated in isolation from other emergency management activities.
3. Full-Scale Exercise: This is intended to evaluate the operational capability of emergency management systems in an interactive manner over a substantial period of time. It involves the testing of a major portion of the emergency plan and organizations in a stress environment. This type of exercise includes mobilization of personnel, resources, and actual movement of workers, equipment, and resources required to demonstrate coordination and response capability (OEM Sample Plan, April 28, 1994: G-4)

For example, Benton County has participated in a statewide earthquake drill, or full-scale exercise, called "Quake-X '94 on April 13-24, 1994. The Oregon Emergency Management office organized the drill, and the Emergency Services Coordinator attended pre-planning meetings to discuss the exercise. Several public, private, and volunteer groups from Benton County and other levels of government participated in this subduction zone earthquake simulation: eleven Benton County agencies; eight municipal agencies; Oregon Department of Transportation and Oregon Emergency Management; and eight private/volunteer organizations participated

in "Quake-X '94" (Participant observation, April 13, 1994; Quake-X Benton County Players' Handbook, April 1, 1994: 4-5). Organizers said the goal of this exercise was to improve inter-agency coordination in the event of a large-scale disaster, such as a subduction zone earthquake off the Oregon coast.

In December of 1994, Benton County Emergency Services and the Council's Operations Subcommittee organized an exercise for private industry called, "Violence in the Workplace." The newly completed Emergency Operations Center (EOC) was used for the first time in this exercise (Participant Observation, Jan. 18, 1994). The drill emphasized potential and actual communication issues between the EOC and emergency personnel (i.e., fire, police) in the field. As a result, one business that participated in this functional exercise donated a fax machine, scanner, and color computer monitor to improve communications during future emergencies. The Emergency Services Coordinator referred to exercises as "lessons learned" for future disasters.

This planning approach is unique in that private businesses not only organized exercises, but also served on functional annexes, such as evacuation, resource management, transportation and recovery. These groups can benefit the community during disasters because they provide the other resources besides computers and fax machines, but also sand bags, bulldozers, temporary shelters, and a variety of professional skills. Lastly, local government and private industries have exchanged information by cooperative training efforts, informal visits, attending Council meetings, and participating with exercises and drills.

Step 5: Evaluating Plan

The final stage in the disaster planning process involves evaluating and maintaining the EOP. While Benton County has not reached this stage in the planning process, the Emergency Services Coordinator has used and evaluated the current EOP during exercises and drills. The exercise program is a fundamental part of ensuring that the EOP is examined periodically and remains familiar to the participants responsible for emergency management functions. In this way, participants are reminded that disaster planning is a cyclical process. The Emergency Services Coordinator, planning participants, and Council members focus on more than just assessing hazards, formulating, coordinating, exercising, and evaluating as they re-write EOP. They have developed networks, maintained discussions, and have been educated about their tasks as they complete functional and hazard specific annexes, as well as participate in exercises. Benton County does not focus on the EOP as the end product for disaster planning, rather, they seek a continuous planning *process*. However, it is apparent that Benton County struggles to meet pre-established goals of community involvement within a realistic timeline. The next section will explore six aspects of disaster planning specific to Benton County.

Six process characteristics in Benton County

So far this chapter has looked at the background to disaster planning in Benton County, as well as described the stages in planning. For the purposes of this study, the researcher chose to examine six process characteristics (organizational structure, problem

definition, leadership approach, citizen involvement, role of experts, and outcome) of disaster planning in Benton County.

Organizational Structure

There are two interrelated organizational structures involved with disaster planning in Benton County. First, the Office of Emergency Services plans and prepares for disasters in Benton County within an external, hierarchical organizational structure that includes state and federal agencies. For instance, two external emergency management agencies, Federal Emergency Management Agency (FEMA) and Oregon Emergency Management (OEM) provide financial and technical assistance to Benton County for disaster planning.

Federal dollars funnel down to counties through OEM, which is the state agency responsible for guaranteeing federal funds are spent properly, as described in ORS 401.280:

> More than 80 percent of OEM's operating budget comes from FEMA. Emergency Management Assistance (EMA) programs provide pass-through funding to local government to assist in the maintenance of emergency management facilities. FEMA requires that a minimum of two-thirds of the EMA funding be given to local emergency management agencies (for planning, training, and preparedness activities) (OEM handout, 1993, p. 2).

In FY 1994-95, Benton County received $27,000 from FEMA. Benton County also allocated $103,809 from the General Fund for emergency services (See Table 13). Benton County projected a slight

increase in FEMA funds for the next year to $35,000 (Benton County Budget, FY 1994-95, p. 74).

Table 13: Benton County Budget for Emergency Services (1991-97)

	91-92 Actual	92-93 Actual	93-94 Budget	94-95 Budget	95-96 Projected	96-97 Projected
Fees	0	0	0	0	0	0
Unrestricted Funds/Taxes	0	0	0	0	0	0
Program Dedicated Funds	40,191	32,530	27,000	27,000	35,000	24,000
Total Revenues	40,191	32,530	27,000	27,000	35,000	24,000
Personal Services (Salaries)	61,066	79,008	66,463	72,440	77,399	80,058
Materials and Services	9,955	10,412	17,355	25,901	26,652	27,406
Capital Outlay	0	6,974	12,399	5,000	5,000	5,000
Other	0	0	0	0	0	0
Total Expenditure	71,021	96,394	96,217	103,341	109,051	112,464
General Fund Requirement	-30,830	-63,864	-69,217	-76,341	-74,051	-88,464

Source: Benton County Budget, FY 94-95: 73

There are five basic tasks that FEMA requires LEMAs to complete before they can receive federal, or "Emergency Management Assistance (EMA)" funding:

1. Coordination and implementation of a local integrated Emergency Management System which includes the all-hazard environment approach emphasizing survivable crisis management systems.
2. Review and update of the emergency management policies, plans, and emergency guidelines as identified in the attached function specific workplan.
3. Operating procedures/emergency guidelines are to be reviewed, updated, and exercised in accordance with FEMA's State and Local Exercise Requirements.
4. The local Emergency Management Program staff will attend related training events during the fiscal year for a minimum combined total of twenty hours.

5. Consistent with local resources and needs, additional activities may be programmed as deemed necessary and appropriate by the Chief Executive Officer (Local/State Comprehensive Cooperative Agreement, FY 95).

In addition to annual federal funding distributed by OEM, local emergency agencies can apply for FEMA mitigation and preparedness activities. In 1990, Benton County applied for a FEMA emergency preparedness grant (Key Informant interview, March 30, 1995). However, only one grant was given annually per region, and Alaska received it for Region X in 1991 (Key informant interview, July 8, 1994). No other attempts for grants have been made.

Another potential source of revenue for LEMA's coffers was introduced during the Oregon State legislative session in Spring of 1995. However, the bill "Disaster Management, Preparedness, Mitigation, Response and Recovery Trust Fund" (HB 3440), did not reach the House Floor. That bill proposed an estimated $7 million in revenue would be generated for Oregon's local emergency services programs annually (Participant Observation, Oregon Emergency Management Association meeting, Feb. 6, 1995; Emergency Services Coordinator interview, March 31, 1995). The sponsor of that bill, Oregon Representative Gordley, a Portland Democrat, requested that a bi-partisan task force look at re-introducing a similar bill during the interim period for a future session (letter, April 14, 1995). (Currently, only Florida has a program which requires a percentage of homeowners' and private industry's insurance premiums to be designated to a statewide emergency services trust fund.)

FEMA has designed five courses as part of its Professional Development Series (PDS), including emergency planning, for people involved in emergency services (Participant Observation, May 16-20, 1994). These courses are organized throughout the state by OEM to provide county coordinators and others with technical assistance for disaster planning. During 1994-95, five Benton County officials completed all five PDS courses, and six persons attended at least one PDS course, including the researcher (Emergency Services Coordinator interview, March 31, 1995). In addition, FEMA offers training and educational courses at their Emergency Management Institute (EMI) in Emmitsburg, Maryland. In 1994-95, four Benton County employees and two City of Corvallis employees from public works, parole and probation, public affairs, public information, participated in EMI courses (ibid.). In addition, the Key Informant also participated in numerous family preparedness seminars at EMI since 1990 (Key Informant interview, March 30, 1995). In short, Benton County personnel and officials are taking advantage of OEM and EMI courses, while networking with other local, state, and federal emergency services personnel.

Other than the financial and technical assistance of OEM and FEMA, disaster planning in Benton County incorporates an internal organizational structure. There are several public, private, and volunteer groups in Benton County that participate in the process of disaster planning; however, two that significantly influence disaster planning are the Benton County's Office of Emergency Services and the Benton County Emergency Management Council.

Benton County's Office of Emergency Services

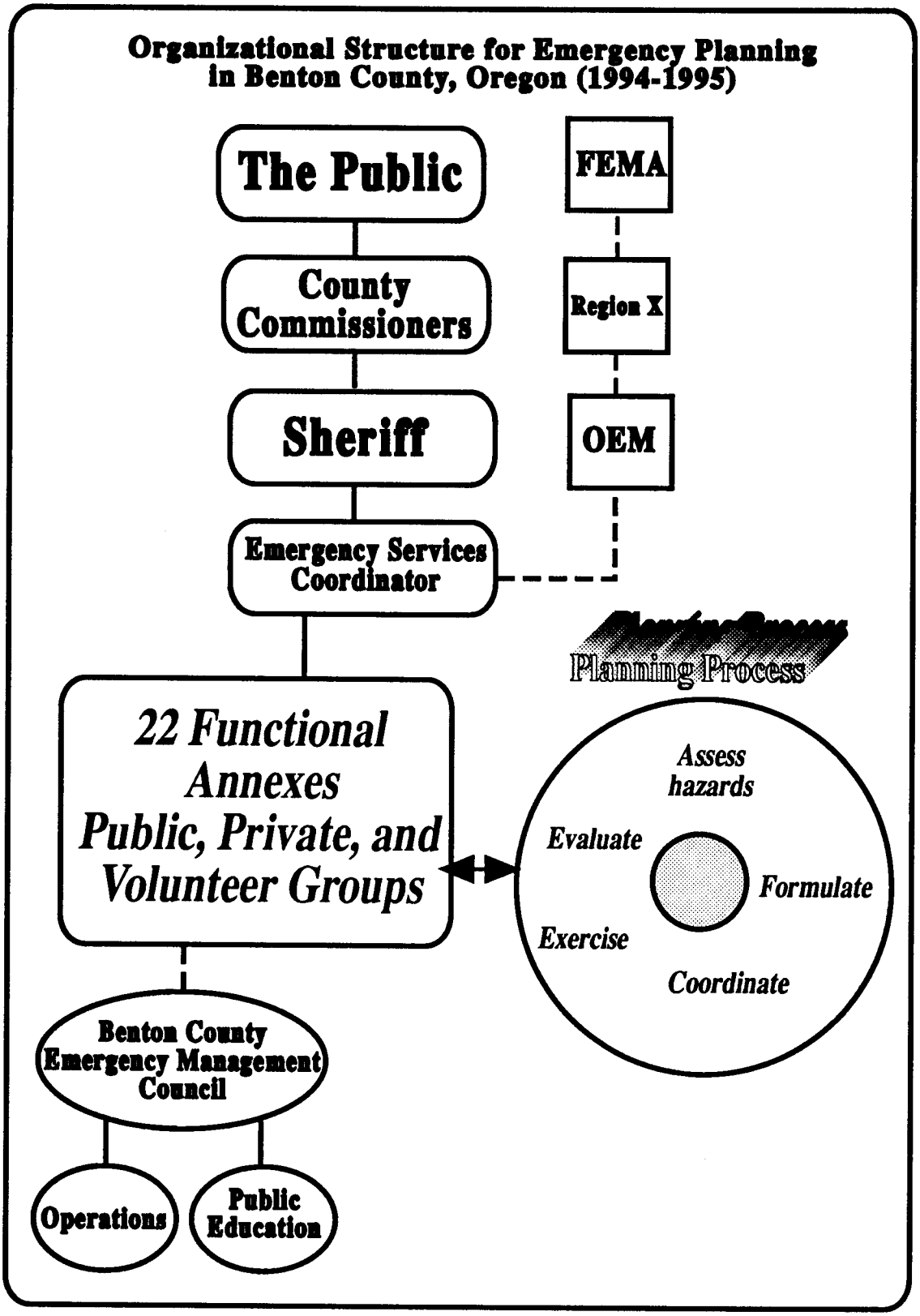
The Benton County sheriff is responsible for managing the Office of Emergency Services, as well as law enforcement and corrections (Sheriff interview, Sept. 1, 1994; March 26, 1995). The current incumbent has been sheriff since 1989. The Office of Emergency Services employs one full-time coordinator. The Emergency Services Coordinator is responsible for providing:

> Coordination of emergency services for all natural and (hu)man-made disasters, including search and rescue operations, outdoor safety programs and hazardous materials incidents for all residents of Benton County (Benton County Budget, 1994, p. 73).

In addition to coordinating disaster planning and response, the Emergency Services Coordinator also manages Benton County's Search and Rescue (SAR) program. About 135 volunteers assist the coordinator with search and rescue, ham radio operators, emergency services, and administrative duties (Emergency Services Coordinator interview, March 31, 1995).

Figure 3 illustrates the relationships among the Emergency Services Coordinator, sheriff, and county commissioners. For instance, the Coordinator is held accountable by the sheriff for maintaining the county's emergency management program. The three county commissioners, who are the chief executives of the county, also oversee his activities (Benton County Budget, FY 1994-95, p. 28). The commissioners, who serve three-year terms, are responsible for ensuring that appropriate local policy is adopted "to promote health, safety, and welfare of county citizens" (Benton County Budget, FY 1994-95: 28-29).

Figure 3: Organizational Chart for Emergency Planning in Benton County (1994-95)



Benton County Emergency Management Council

In April, 1991, Benton County Emergency Services Management Council was formed at the urging of a concerned citizen who later was appointed by the sheriff to be the chairperson (Key Informant). The Council, which was renamed Benton County Emergency Management Council, is divided into two subcommittees: public education and operations (See Figure 3). The former is responsible for increasing public awareness through educational activities, seminars, and community events, while the latter is charged with improving inter-agency coordination during emergencies by exercising SOPs during drills and simulations (These committees' activities will be described in the citizen involvement and outcome sections). At this time, the Council meets every other month, with the public education and operations subcommittees meeting alternating months (Key Informant interview, July 8, 1994).

The Emergency Services Coordinator described the value of having the Council:

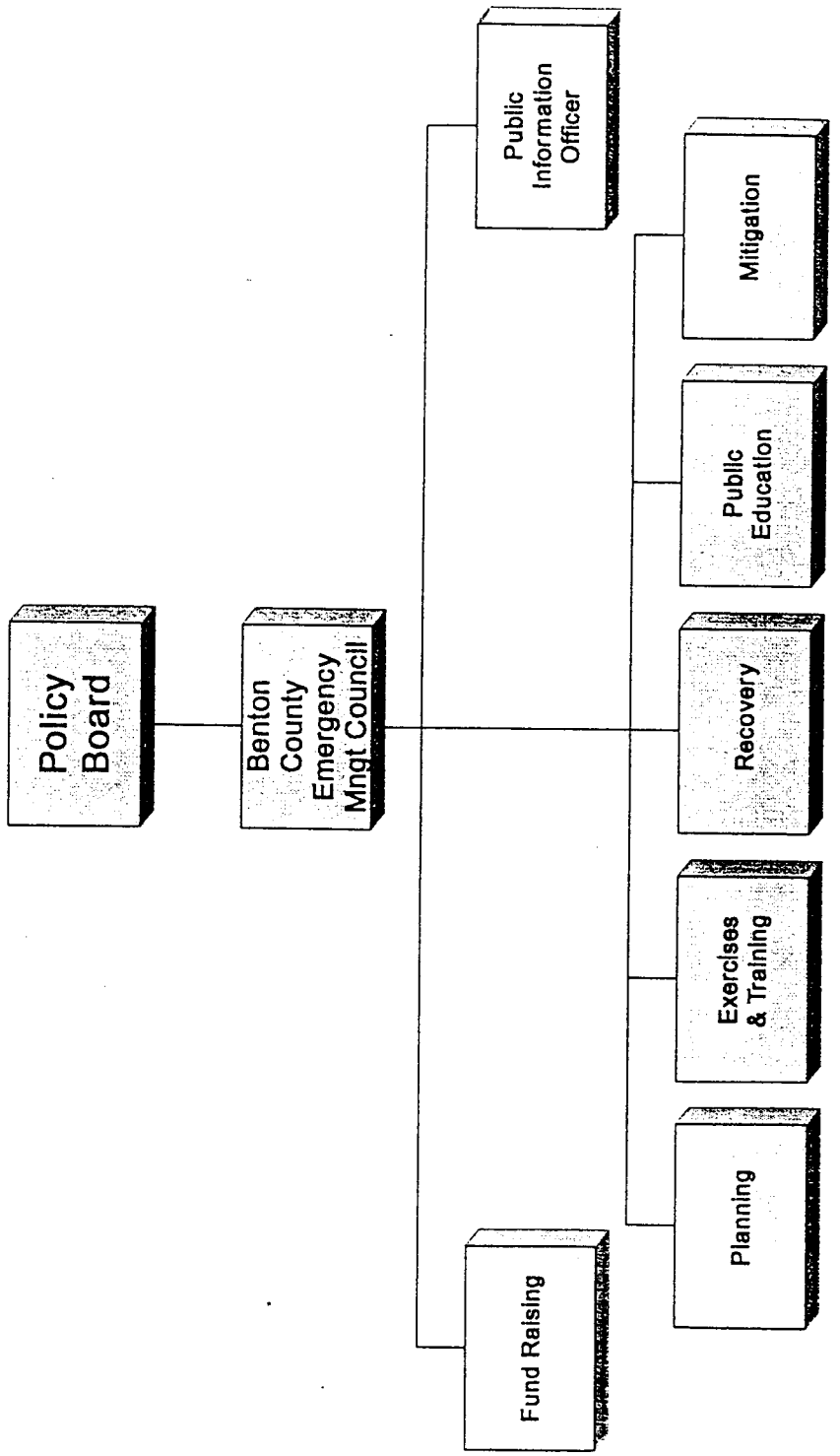
> The Council is made up of city, county, and state public service agencies, educational systems, private industry, volunteer organizations, health care organizations, private citizens. The goals of the council are to foster a sense of community and coordination in planning for both natural and (hu)man-made disasters and to strive for a systems approach to planning which ensures a traditional response to emergency events. This would maximize effectiveness of combined public and private resources. Another goal is to educate the community in 72-hour preparedness for survival (Emergency Services Coordinator workplan notes, 1993).

Many of the Council's members, such as local agency personnel, elected officials, private businesses, and volunteer organizations, are also involved with the re-writing of the emergency plan. Some participate on one of the functional annexes, while others organize community outreach activities.

It is apparent that disaster planning continues to evolve in Benton County. At the time of this study, two issues were being discussed. First, members were discussing the possibility of restructuring the Council so that a policy board of community leaders would oversee five specific committees (Participant Observation, March 15, 1995). (See Figure 4). This would improve the accountability of the participants involved in re-writing the twenty-two functional annexes, and generate more support on the part of elected officials and agency department heads.

Secondly, the Council is considering how to organize neighborhoods and individuals in order to involve communities in disaster planning and to identify special needs and resources. They are proposing the formation of neighborhood association emergency preparedness organizations. Similar programs have been implemented already in Portland, Oregon Fire Bureau's Neighborhood Emergency Team (N.E.T.), and in California's Citizen Emergency Response Teams (CERT) (Key Informant interview, July 8, 1994; Participant Observation, Oct. 19, 1994). The Key Informant met a consultant during a national training session at EMI who organized neighborhood emergency management programs in Santa Clara County, California, and Kitsap County, Washington. The Council is now considering hiring the consultant to implement a similar

Figure 4: Proposed Re-structuring of Benton County Emergency Management Council (1995)



neighborhood organization program in Benton County (Participant Observation, July 20, 1994, and Oct. 19, 1994). This would be a new technique for Benton County to include more public input in planning and organize communities for disasters.

Problem Identification

The second element of the disaster planning process is problem identification. One key question that guided the researcher's investigations was: How does Benton County define real or perceived disaster problems in order to plan for them? In the past, Benton County had to comply with federal agency objectives and procedures for civil defense instead of all-hazards functional planning. This section will describe two factors that have affected problem identification in Benton County: national security priorities and local needs; and FEMA Region X's support of community-based planning.

National Security Priorities and Local Needs

National security priorities were an obstacle to planning for many LEMAs previously. For instance, FEMA emphasized national security issues. This meant Benton County followed specific FEMA mandates for civil defense or nuclear attack-related planning. Waugh Jr. (1994) describes how focusing on nationally-defined problems affected state and local agencies:

> During the 1980s, in particular, FEMA suffered from poor leadership that resulted in very high turnover in personnel, legal charges against some political appointees and contractors, and a fluctuating set of programmatic

> emphases. State and local officials often found themselves at odds with FEMA over resources and responsibilities and confused by the rapidly changing priorities.... this conflict characterized FEMA's operations in the 1980s, as well as the controversies concerning FEMA's authority and its organizational culture which were shaped by national security priorities (Waugh Jr., 1994: 254).

FEMA's emphasis on national security is changing. Congress commissioned the U.S. General Accounting Office (GAO) and National Academy of Public Administration (NAPA) to investigate FEMA following Hurricane Andrew in 1992 (Sylves, 1994, p. 303). NAPA's final report (1994) concluded: "The time has come to shift the emphasis from national security to domestic emergency management using an all-hazards approach" (p. x; Sylves, 1994, p. 304). In 1992, President Clinton appointed James Lee Witt as director of FEMA. While attending the OEM's 1994 annual meeting in Bend, Witt stated that FEMA intended to shift its priorities from nuclear attack planning to mitigation and disaster preparedness programs (Participation Observation, August 30, 1994). This indicates that LEMAs, such as Benton County, could now focus on more threatening local concerns and issues other than civil defense. Benton County has identified local problems by completing a hazard analysis.

FEMA Region X Initiatives

FEMA's regional offices also influence problem identification in Benton County. FEMA Region X office, which oversees state and local emergency management in Oregon, Washington, Idaho, and Alaska,

recently emphasized the importance of communities defining their own problems, and then designing a preparedness plan that meets their needs. This means that planning would be centered on even lower levels than the county or local governmental level. They propose that government shares responsibility and cooperative disaster response efforts with the public (FEMA Region X State and Local Assistance Planner interview, September 6, 1994 and January 5, 1995).

The initiative that FEMA Region X has been recently promoting is Community-Based Emergency Preparedness (CBEP). It has encouraged Benton County to become a model for other communities to follow. The FEMA Region X representative noted many resources already exist at the community level:

> Too often local government officials are not prepared to respond to major emergencies because they tend to rely only on the limited number of local government employees for response operations. They tend to neglect significant resources in the leadership and expertise that exists throughout the community which can be involved in a community effort to respond to a local disaster. Local officials need to facilitate community involvement and provide primary leadership in developing and maintaining a community-based capability (letter, August 12, 1994)

While FEMA Region X does not have legal authority to mandate community-based planning, it is informally supporting emergency management programs at the community level by visiting Benton County. For example, the State and Local Assistance Program Representative at Region X attended a Benton County Emergency Management Council meeting (November 16, 1994). He also involved

himself in educating and speaking to local emergency management leaders when he participated in a panel discussion, "Government Facing Disaster," at Oregon State University (November 17, 1994) with the Emergency Services Coordinator and Key Informant (Participation Observations, Nov. 16-17, 1994).

Next, the Region X representative and a FEMA Region X Seismologist observed an Emergency Preparedness Seminar at Oregon State University which involved about 200 Linn-Benton county citizens (Participant Observation, April 10, 1995). Both Region X representatives attended a preliminary meeting at the Benton County Emergency Operations Center (EOC) (Participant Observation, April 11, 1995). They met with other county and city emergency officials, private business leaders, newspaper editor, Red Cross representative, the Key Informant, and OEM representative to discuss the possibility of applying for an earthquake mitigation grant (Participant Observation, April 11, 1995). Visits to Benton County by Region X representatives translate into support for community-based planning. It is evident from these meetings that FEMA Region X and Benton County have established a relationship, and they are pushing for a new planning approach.

Leadership Approach

The third process characteristic is the leadership style or approach. In Benton County, many individuals could be identified as leaders involved with disaster planning, including elected officials (e.g., sheriff, county commissioners, and mayors), and department heads of city and county agencies. Yet, it became apparent that

elected officials and department agency heads are primarily supporters of the leadership of two individuals: the Emergency Services Coordinator and the Key Informant. This section proceeds to describe how leadership approach influences disaster planning in Benton County.

After observing the incumbent Emergency Services Coordinator over a period of twelve months, it became evident that he was taking a proactive stance to disaster planning, when compared to his predecessor. Rather than merely waiting for a disaster, as in the past, Benton County is now preparing for any type and any size disaster. The coordinator stressed this point at a Council meeting, "It's not a question of 'if,' but 'when' something will happen. We must be prepared" (Participant Observation, Oct. 19, 1994).

At this time, the Office of Emergency Services has only one person: the Emergency Services Coordinator. He has involved volunteer and private groups, and encouraged citizens generally to join in decision making. For instance, he has delegated disaster planning tasks by organizing planning committees to write the functional annexes to the SOP. As seen previously in Table 12, many agencies have been involved in re-writing the county's emergency plan. Not only does the Emergency Services Coordinator informally interact with committee members during Council meetings, emergency exercises, and drills, but he also works with other city and county agency personnel, such as law enforcement and fire protection, on a day-to-day basis (Participant Observation, March 15, 1995; Interview, February 24, 1995). The Emergency Services Coordinator cannot impose tight control on these groups, but he uses

a "sharing" style compatible with this fact, being sure to involve people in planning. This networking in large part is what will be activated during disasters.

The Emergency Services Coordinator himself describes his role as "a coach or facilitator for the commissioners and public safety department heads" (Interview, March 20, 1995). Overall, he has accomplished three goals in this area: elected officials and department heads are now aware of their emergency management role, trust the coordinator, and take emergency preparedness more seriously (Participant Observations, October 19, 1994). The main advantages of using this type of participative approach, he cited, is greater awareness by agency personnel and supervisors of their responsibilities, and to work through those tasks before a disaster (Emergency Services Coordinator, interview, July 7, 1994). By including more people, Benton County hopes to be better prepared to react more swiftly, more effectively, and cut costs.

In addition to involving others and delegating disaster planning responsibilities to others, the Emergency Services Coordinator cultivates communication and coordination among different government levels and organizations. He follows FEMA's rules and regulations, and is knowledgeable about procedures. He has completed FEMA's Professional Development Series courses organized by OEM. Through his networking at OEM, he has taught several training courses, including Community-Based Emergency Planning (Participant Observation, May 17, 1994). Moreover, he is approachable through an "open door" policy. To further raise public awareness, he regularly gives presentations to local civic

organizations. He allowed the author access to his files and meetings for the current research. The files included minutes of previous Council meetings, and OEM quarterly workplan reports.

Lastly, his leadership approach has been regarded as a model for other county emergency coordinators. For instance, he is an active member of the Oregon Emergency Management Agency (OEMA), an independent association for those involved in emergency management. He was awarded the "1994 Outstanding Emergency Program Manager - Urban" at OEMA's annual meeting in Bend (Participant Observation, August 30, 1994), and elected president of OEMA in 1995-96 (Participant Observation, February 6, 1995). During his two-year tenure, his accomplishments have been recognized favorably by many, including the Key Informant, a Benton County citizen activist. His participative and open leadership style has allowed the community approach to work better.

The Key Informant has also emerged in a citizen emergency preparedness leadership role in Benton County. Her leadership approach is best described by three components: (1) creating a vision, (2) promoting that vision, and (3) networking to achieve that vision. First, the Key Informant has a developed a clear vision of her goal, namely community-wide emergency preparedness (interview, July 8, 1994). She has taken the effort to become educated and informed about emergency preparedness. As the chairperson of the Benton County Emergency Management Council, she significantly influences the group's agenda (Key Informant interview, July 8, 1994; Participant Observations, Jan. 18, 1995). Secondly, where many citizens voice concern but do not act, the Key Informant

communicates her enthusiasm to community leaders and others at Council meetings and Emergency Preparedness Seminars (Participant Observations, April 10, and 20, 1995). At these public events, the Key Informant shares personal stories to motivate individuals, families, volunteer groups, and neighborhoods to prepare for disasters. Third, the Key Informant has learned from previous experiences how to operate and network within the political and bureaucratic environment to benefit her local community (interview, July 8, 1994). Her involvement will be described further in the next section.

Citizen Involvement

Citizen involvement has been one of the central topics throughout this study. The researcher found three aspects of citizen involvement evident in Benton County's planning process: (1) community coalitions, (2) officials sharing responsibility with public, private, and volunteer groups, (3) and educational programs for citizens.

According to the literature, one prevalent obstacle for disaster planning has been an apathetic public (Rossi, Wright, and Weber-Burdin, 1982). The Sheriff commented on difficulties with low public support before disasters, and high expectations of government when disaster strikes. He said:

> People expect someone to come in and save the day. We try to get the public informed with preparedness activities. You're not going to get all of them. It takes responsibility on the people's part. I think we are sort of

> on that track. We have come a long way say, from 4-5 years ago. It's going to take some time (Sheriff interview, Sept. 1, 1994).

The Sheriff's comments reflect one perspective on disaster planning. But Benton County residents view disaster risks more or less urgently. For example, the Key Informant's motivation for promoting emergency preparedness stems from her church's influences. She said:

> The recommendation from our church is that you ought to store a year's supply of food and clothing. There are probably lots of people in our church who don't, there are lots of people who do (Key Informant interview, July 8, 1994).

Benton County officials said they have been fortunate to have an activist in the community. As mentioned in the organizational structure, the Key Informant was fundamental in creating the Benton County Emergency Management Council. Now, that Council is trying to convince public, private, and volunteer groups to share the responsibility of emergency preparedness by pursuing a proactive community outreach program. For instance, the Council's public educational subcommittee seeks to provide knowledge and training for individuals, families, businesses, and neighborhoods to become self-sufficient during disasters. In an interview, the Benton County Sheriff said:

> We need to get out and involve the community and engage them on an educational basis so that they can hold their own and make them understand that we can't be all things to all people in the middle of a disaster. They're going to have to depend upon themselves and they're going to have to depend upon their neighbors (Sheriff interview, Sept. 1, 1994).

Since its formation in April of 1991, the Council has developed several community outreach programs to inform the community about disaster planning. For instance, the Council's public educational subcommittee, headed by a Benton County extension agent, organized an Earthquake Preparedness Seminar at Oregon State University on April 26, 1994 (Participant Observation, April 26, 1994). Over 600 people attended (*Gazette-Times,* April 27, 1994: A2). The purpose of this event was to inform the public about seismic hazards. There were three 45-minute break-out sessions in medium-sized classrooms (about 75 people) in which representatives from FEMA, OEM, private insurance, American Red Cross, Benton County Emergency Services, fire and law enforcement described their roles and responsibilities, and answered the audience's questions. Furthermore, independent vendors displayed emergency-related services and products such as homeowner insurance and first aid kits, in addition to educating local residents how to use a fire extinguisher, secure water heaters, and turn off gaslines.

The Benton County extension agent developed a survey to gather data from the seminar, and reported the results to a Council meeting. First, the survey found that knowledge about earthquakes and emergency preparedness was increased because of this seminar.

Second, the participants found the two keynote speakers, a geologist and an engineer from OSU, and breakout sessions were informative. Third, that people would attend next year if given new information (Participant Observation, July 29, 1994).

The following year, the Council's public educational subcommittee organized two emergency preparedness seminars again at the OSU campus (Participant Observation, April 10 and 20, 1995). Officials from state, federal, and local levels attended. The goal of the seminars was to inform the public about community risks, and how to be prepared for an earthquake (Public Education subcommittee's press release, March 23, 1995). Vendors also attended the seminars.

A survey was distributed to gather information about possibly organizing a pilot project for a neighborhood association emergency preparedness organizations, like Portland's Neighborhood Emergency Team (N.E.T.), and California's Citizen Emergency Response Teams (CERT) (Appendix D). The results of the survey have not yet been tabulated; however the Council is considering neighborhood association emergency preparedness organizations as one method for the increased public involvement in disaster planning. Ideally, neighborhoods and individuals would be organized so that they can identify special needs and resources (Key Informant interview, July 8, 1994; Participant Observation, April 10, 1995).

Other activities that the Council's educational subcommittee organized was an interactive county fair booth with the theme, "Don't Gamble With your life, Be prepared" August 2-7, 1994 (Participant Observation, August 2, 1994). Council members and other volunteers

who staffed the booth, and informally interacted with fairgoers, especially children. They distributed Red Cross literature, such as an emergency supplies checklist for families. They also offered games to test basic knowledge of emergency preparedness and local hazards. They gave out balloons with the Benton County Emergency Management Council slogan, "Are you ready?" Several local businesses donated prizes at the event.

FEMA and the American Red Cross have teamed up to create an educational packet, "Family Preparedness Program," which includes videos (i.e. "Disaster Dudes") pamphlets, and additional informational materials. The American Red Cross chapter for Linn-Benton County is located in Albany, and has an office in Corvallis. It reported that "over 30,000 copies of disaster services materials have been distributed in the past 18 months" (Participant Observation, March, 30, 1995). The chapter offers several disaster services courses, as well as first aid and CPR. Some Red Cross volunteers from Linn-Benton counties completed specialized training in resource management, damage assessment, mental health, and shelter management. They served during presidential-declared disasters, such as the Midwestern Floods and Northridge Earthquake (Participant Observation, October 19, 1994). This exposes these citizens to the importance of pre-disaster preparedness activities that the Council encourages.

In addition to sharing and planning community educational activities among volunteer groups, the Council is including private businesses in community preparedness programs. The American Red Cross and FEMA have designed an emergency preparedness guide for

business and industry. The Key Informant gave a copy to the new Chamber of Commerce director. She is engaged in emergency preparedness presentations to business and industry (Participant Observation, Oct. 19, 1994). By including local businesses in this process, resources are identified before a disaster, and contracts are pre-arranged. Furthermore, some businesses are investigating installing generators for alternate power sources, so they may be able to operate following an emergency, thus reducing a probable business disaster.

The Council's public educational subcommittee and other members also plan more intensive community efforts in the future. During a follow-up interview with the Key Informant who started this broad-based interest in emergency preparedness, she said that she expected there will be more community preparedness activities in Benton County. Many, including the Sheriff, support continuation of similar activities as long as there are resources. For example, when asked what he would want to see happen if he was given $1 million for anything, the sheriff responded:

> I would like to spend the money on the community, doing fairs, training for preparedness for any type of disaster, (wind storms, fire, earthquake) public affairs type of work so that people felt as though it wasn't just public safety that is going to come in and save the day (Sheriff interview, Sept. 1, 1994).

Community outreach events organized by the Benton County Emergency Management Council are the primary intervention to

encourage citizens to become educated about disasters. They have generated support both in public and private sectors of Benton County.

Role of Experts

In Benton County, experts aid in the process of disaster planning in three general areas: hazard analysis, training, and public education. First, the Emergency Services Coordinator relied on previous studies that were conducted by experts when he formulated the county's hazards analysis. For example, in 1987, the Army Corps of Engineers provided data for flood inundation maps, and estimated flood elevations and arrival times in case one of five dams near Benton County failed. Similarly, in 1986, FEMA conducted a flood insurance and hazard study of Benton County which was used to identify the 100-year floodplain and floodway general locations. Next, in 1991, the Oregon Department of Forestry conducted a study on wildland fire risks for forested areas of western Benton County. These three examples of state and federal agency studies provide invaluable information for emergency personnel, such as public works and fire officials in Benton County.

The second disaster planning aspect for utilizing experts is evident when consultants visit Benton County to update emergency personnel with advanced training. The Council has invited several guest experts, such as an urban search and rescue specialist from Florida. He made a presentation at a Council meetings, in addition to providing training for various fire officials (Participant Observation, October 19, 1994). This contact was made by the Key Informant

while networking at national emergency management functions at EMI. The only expense for this expert's training was the airplane ticket; he used his vacation time and stayed with the Key Informant's family. This is a good example of using alternative methods to gain expert information without expending large amounts of resources.

Public education is the third part that experts play in disaster planning in Benton County. It is challenging for experts to reach the public with hazard information. Following the Scotts Mills earthquake in March of 1993, however, many people were concerned about the possibility of future seismic risks in their community. The Council was able to take advantage of geologic and engineering experts at Oregon State University, which is located in Corvallis, the heart of Benton County. For instance, OSU geologists have explained and translated scientific information at a Council meeting (Participant Observation, April 26, 1994). An OSU structural engineer discussed the effects of Kobe, Japan earthquake in a public session (Participant Observation, April 5, 1995). While it may be difficult for the community to understand hazard risks and get involved in disaster preparedness, experts have played a significant role in aiding with hazard analysis, training, and public awareness.

Lastly, it is important to explain that the Key Informant has become an expert herself. Indeed, sometimes citizens may become experts through experience and training in a specific field (Hadden, 1989: 207). This was evident with the Key Informant, who was invited to participate on an year-long policy advisory committee for the U.S. Congress Office of Technology and Assessment (1994-95) (Key Informant interview, March 30, 1995). This subcommittee, a

select group of scientists, engineers, and a public education specialist, provide policy options for how legislators spend $1 million earthquake mitigation block from National Earthquake Hazard Reduction Program (NEHRP) funding (ibid.). Thus, the Key Informant has been recognized as an expert, which is unique because disaster planning has become more technical in nature due to advances in technology and its application to hazard management. One advantage is that she is closer to the locus of decision making. However, there are some drawbacks: it takes a considerable amount of time and effort for one member to have much impact on decisions.

Outcomes of Planning

OEM and FEMA require Benton County to have a disaster plan. Benton County is in the process of re-writing its EOP, which has thus far taken 16 months. Because the final document is not yet completed, it could be said that it has not met the outcome goal. In Benton County, the outcome of disaster planning has focused on more than just re-writing and exercising their EOP. For instance, the Emergency Services Coordinator is facilitating coordination and collaboration efforts so that individuals continue to develop informal networks and maintain open communications as they complete functional annexes. Likewise, the Key Informant has been instrumental in establishing a community coalition which has, in turn, organized several community outreach programs and practiced emergency procedures during drills. Thus, Benton County has not been focusing on the EOP as the end product for disaster planning, they have been nurturing a continuous planning *process* (Quarantelli,

1988). At this stage, Benton County is far from reaching all areas of the community. Officials try to reach a broader section of the community; however, gaining community support for emergency preparedness still remains to be an obstacle.

How does Benton Co. measure against the models?

From the information gathered during interviews, documents, and participant observations, these six characteristics provide a framework for analyzing Benton County's approach to disaster planning. Chapter 5 described two disaster planning models: Traditional Emergency Management System (TEMS) and the Community-Based Emergency Preparedness (CBEP). It is evident that Benton County is trying to implement the community-based approach, but several aspects point to the fact that they are still using TEMS approach.

The CBEP approach is difficult to implement for several reasons. First, Benton County must operate within hierarchical, bureaucratic, and formal systems that make planning complicated and troublesome. Disaster planning becomes complicated as local agencies try to coordinate with other federal, state, private and volunteer organizations. Since the Fall of 1994, however, Benton County has been getting informal support from FEMA's Region X offices for implementing the CBEP approach. FEMA Region X representatives wish to share disaster planning and response tasks, and organize planning at the community level.

Benton County has made some progressed towards community-based planning. For instance, they no longer have an EOP that solely

emphasizes national security issues. Instead, the Emergency Services Coordinator has directed the EOP revision process with a participative leadership approach. He has developed a framework in which public, private, and volunteer organizations may be involved in the planning process. Moreover, these groups have become stakeholders and have ownership in a community preparedness program. The Emergency Services Coordinator delegates disaster responsibilities which illustrates that Benton County is developing more than just an EOP. More individuals and agencies have been involved during the process of writing Benton County's emergency plan; participants are establishing active networks, communicating about their roles, and assuming responsibility for disaster. This is quite different from the past when the plan sat on a shelf collecting dust. Still, Benton County has only begun this process that the entire community can agree upon.

Benton County Emergency Management Council has been the vehicle for these groups to get involved. It was formed when a citizen turned activist/expert shared her vision of emergency preparedness with others. That vision has been transformed into a legitimate community coalition, the Benton County Emergency Management Council. While this group tries to share disaster preparedness information through public educational programs, they are unsuccessful in reaching everyone. Unless people perceive there is a risk, they tend to ignore that a disaster will take place (Quarantelli, 1988). Participants rely on experts to translate risks so they might better understand potential hazard mapping.

Previously, the public was not included in disaster planning. After a citizen began to question the county's emergency capability, she became educated in emergency preparedness. This was not a easy task. She confronted a closed environment that assumed that the public was unable to understand sophisticated disaster planning procedures. Hence, the public had been trained to be apathetic.

Additionally, after several devastating and costly disasters in the United States, the lead agency in emergency management, FEMA, has had a difficult task of educating the public to become prepared. Since the 1950s, people have grown to have high expectations for government to bail them out during times of disasters. One major implication is people have little incentive to organize their family, neighborhood, or workplace for future disasters.

In Benton County, The Emergency Services Coordinator and Key Informant have taken a proactive stance involving the community. They recognized that this is a long process that requires continuous updating and meeting to exchange information. they try to promote team work, and bottom-up approach to disaster planning. In this way, the organizational structure of disaster planning in Benton County is horizontal, relies on networking and informal arrangements. This is also evident in the relationship between the Council and coordinator's functional annexes assignments which is similar to the CBEP approach. Such examples have brought Benton County closer to implementing the CBEP approach. However, disaster preparedness has not taken hold. This chapter described how the Emergency Services Coordinator and Key Informant have favored moving toward the CBEP model to include more people in the

planning process. However, involving citizens is time-consuming because more people make it more difficult to agree on common goals and means to carry out those objectives.

This case study also examined previous activities that Benton County is currently implementing to involve the community in disaster planning. It outlined twelve potential hazards which Benton County has identified. Table 14 summarizes Benton County's disaster planning process by looking at six characteristics. It illustrates the complexity of categorizing a system that is in the midst of change.

Therefore, one outcome for disaster planning is that a minority of Benton County citizens have been educated about their role and responsibilities before and during a disaster. It is preliminary to suggest that Benton County has become a model for a different approach to disaster planning that is community-based. It is evident that Benton County's disaster planning process is still emerging.

Table 14: Process of Disaster Planning in Benton County (1994-95)

Process Characteristics	Traditional Emergency Management System (TEMS)	Community-Based Emergency Preparedness (CBEP)	Benton County
Organizational Structure	• Hierarchical • Formal • Mandates • Rules and Regulations • Duplicated functions • Rational • Formal agreements	• Networking • Loose-coupling • Informal • Discretionary Behavior • Shared Governance • Intra-organizational • Flexible	• FEMA/OEM requires local tasks before funding granted • Many resources are top-down • Networking during preparedness, training & planning phases • Planning Committees' Structure is horizontal with re-writing plan • More people involved in planning process
Problem Definition	• Uniform problems identified by FEMA/OEM	• Local problems are indicators of community needs • Local values considered	• FEMA-imposed mandates • Sets local programs • Hazard identification using FEMA matrices
Leadership Approach	• Top-down • Directive • Tight Control • Reactive	• Bottom-up • Facilitative • Preventive • Proactive	• Coordinator takes proactive approach • Others included in decision-making • Delegates tasks
Citizen Involvement	• Officials direct public activity • Passive • High expectations of government • Short memories • Must re-learn	• Officials share responsibility during disasters • Establish coalitions • People take responsibility for themselves • Stakeholders	• People rely on government • People "too busy" for pre-disaster planning • Public support and awareness low • Council formed at urging of concerned citizen (bottom-up)
Role of experts	• Experts are central • People have minimal role • Decisions made by policymakers • Risk assessment based on science • Little collaboration among experts	• Experts translate risks to public so they can understand and make decisions • Risk assessment influenced by community values • Experts work together	• Assesses risks • Public has minimal input • Experts provide educational seminars • People acknowledge uncertainty
Outcomes of Planning	• Product-oriented (A Plan) • "Quick fix"	• Process-oriented (Community-development) • Long-term commitment • Continuous process	• Assesses disaster preparedness by having a plan in place • Few know about plan • Information outdated or inaccurate • More people involved

CHAPTER 7
THESIS CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This case study has focused on how Benton County introduced and is currently implementing a new planning approach called Community-Based Emergency Preparedness (CBEP). However, involving private, public, and volunteer groups in the process of disaster planning has been difficult. Since the formation of the Benton County Emergency Management Council, public support and community involvement in disaster preparedness has grown through activities such as bi-monthly meetings, public forums, seminars, training, and exercises. Yet, it appears that Benton County is on the path to a transformed process of planning and preparing for future disasters. It has yet to realize the importance of involving all aspects of the community -- in order to reduce costs and damage of hazards. As a new planning approach is implemented, however, it can be expected to reveal its own limitations and flaws. It has proceeded far enough in Benton County to indicate successes and limits of its Community-Based Emergency Preparedness CBEP approach, though the real test is how it works during a disaster.

From the information gathered through interviews, documents, and participant observations, this chapter draws seven conclusions and suggests several recommendations for future research.

1. In Benton County, disaster planning is in transition to a new community-based system and exhibits aspects from a more

Traditional System of officials monopolizing the process and the community has little knowledge of contingency plans.

Benton County has adopted several practices, including organizational structure, problem identification, leadership approach, citizen participation, role of experts, and outcome. For instance, the Benton County Emergency Services Coordinator undertook CBEP strategies by delegating disaster tasks among various city/county personnel, private businesses, and volunteer organizations. They were assigned to re-write the county's emergency plan. The process has taken longer than anticipated for several reasons. Members of the various functional annex committees have more pressing tasks than to plan, prepare, and exercise for a disaster that are unpredictable. Supervisors of committee members from local agencies may have initially supported disaster planning efforts, yet did not schedule time to complete the tasks. Thus, disaster planning competes with day-to-day tasks and depends on commitment and follow-through of functional annex committee members and their supervisors. Future research might pinpoint other aspects that complicate disaster planning such as public apathy, low political importance, and uncertainty of disasters.

2. Benton County's internal organizational structure for disaster planning is heterogeneous, informal, and relies on networking strategies, while its external organizational structure is formal, bureaucratic, and hierarchical.

This case study examined, in part, FEMA's evolving role with other federal agencies, state and local governments, and volunteer

and private groups. It also provides a glimpse into the complexities surrounding external and internal organizational structures in disaster planning. This thesis confirms Schneider's (1992) premise that state and local governments are constrained by FEMA's bureaucratic politics and emergent norms during disasters. As FEMA tries to redefine its role and improve its track record, local and state agencies are caught in the middle.

At this time, FEMA and OEM provide Benton County with financial and technical assistance. Additionally, FEMA Region X officials are informally supporting CBEP. Benton County attempts to implement the CBEP approach by identifying and utilizing community resources to improve accountability, save money, serve people, solve problems, and be more flexible before, during, and following disasters. Benton County emphasizes early intervention and a proactive stance in planning.

Future research may focus on aspects of organizational structure, such as power conflicts among various levels of government and agencies. This has been a difficulty targeted in the literature and an area Benton County has worked on. Further studies may also concentrate on the possibility of forming neighborhood emergency preparedness associations. It would be beneficial to study how these neighborhood groups can be maintained to remain effective.

3. Benton County identifies problems from the bottom up.

This case study traced FEMA Region X's initial efforts to facilitate planning, preparedness and mitigation strategies at the

community level in order to reduce federal disaster assistance (FEMA Region X State and Local Assistance Planner interview, Nov. 17, 1994 and January 5, 1995). Benton County has defined twelve hazards and ranked them according to potential risk by following FEMA's Hazard Analysis Matrices.

Future research may examine how FEMA monitors and holds state and local emergency agencies accountable for pre-disaster planning and preparedness activities. Future research may also investigate how organizations perform when they are stakeholders, or "buy into" problem identification. Future research might examine how emergency agencies implement planning approaches when identified problems conflict with other agencies' priorities, such as FEMA's divided emphasis on nuclear attack planning with mitigation and preparedness programs.

4. Participatory leaders, such as the Key Informant and Benton County Emergency Services Coordinator, motivate their community by sharing a vision of disaster preparedness.

This case study found that local emergency management agencies that have active coordinators appear to be well-prepared for unanticipated disasters. This supports Foster's (1980) argument that to have an effective program, coordinators "must have sufficient stature in public service and the community to command the respect and obtain the cooperation of those with whom he (she) will deal" (p. 7). In Benton County, there are two individuals who have central leadership roles in disaster planning. First, the Emergency Services Coordinator is a participative leader who considers others' opinions,

and has delegated tasks to others in re-writing the emergency plan. In this way, emergency personnel, school district representatives, hospital officials, businesses, and others are better informed of their responsibilities and discuss how to accomplish those tasks prior to disasters.

Secondly, the Key Informant has become an expert in emergency preparedness, and has influenced elected officials and community leaders to take preparedness more seriously before disasters occurs. She has accomplished this through networking and by organizing informal community meetings and seminars.

Future research might look at what experience, skills, and leadership potential are needed for an effective emergency services coordinator. Resources currently available to develop effective coordinators should be identified.

5. Citizens are informed of community risks through public educational programs and training seminars organized by the Council.

In Benton County, one concerned citizen organized the community process of disaster planning almost single-handedly She talked county officials into forming the Benton County Emergency Management Council, which combines private and public organizations. However, one individual cannot do all the planning.

It is evident that Benton County is involving the community in disaster planning in two ways: (1) informing citizens about disaster preparedness through educational and training programs; and (2) coordinating interagency disaster response through exercises and

drills. This involves a great deal of commitment, however, on the part of the participants and is time-consuming. The Council is getting the message out about emergency preparedness through public service announcements, in addition to organizing meetings and seminars. Likewise, emergency services personnel are practicing with simulated drills and exercises. At these events, people share information at the grass-roots level. This creates strong support-building and incorporates public involvement in the process of disaster planning.

Future research may look at needed representation on the Council and effective ways to organize community involvement. Some argue much of the population is not included in the membership of these associations. Consequently, disaster planning may not be completely representative of the population.

6. Experts are utilized to identify hazards, and for translating risks to the public through hazard maps.

Since the emphasis is on getting the community involved in disaster planning, it is important that experts provide information in a form that is useful for "fostering, reinforcing and supplementing individual and local initiatives in an effective way" (Morren Jr., 1983: 286). Future research could explore the most effective ways of doing this. More study is needed on when the public takes risks seriously. differences in experts' risk assessment and lay people's risk perceptions, and how they motivate or hinder local policies, such as land use and building codes requirements.

Research in the future can analyze the usefulness to public edification of technologies, such as Geographic Information Systems (GIS). At this time, Benton County Public Works is starting to develop a county-wide GIS to store vast amounts of data, but its use is too limited and insufficient to provide a basis for any conclusions. Future research may look at implementing a hazard mapping project using GIS, and subsequently, exhibiting maps at the public library or publishing them in the yellow pages.

7. The outcome of disaster planning is an on-going process requiring continued public support, the commitment of elected officials, and periodic updating of information and resources.

Heydebrand (1977) describes two types of outcomes: "The first is products, artifacts, or constructs, while the second are the activities" (in Hall, 1991: 30). In other words, the process of disaster planning is itself the outcome, which is dynamic. Rather than relying on a written plan, Benton County is trying to put together a program that resembles Quarantelli's (1985) model. Activities such as public education and training to build networks that constitutes maintaining a dynamic planning *process* (p. 5).

This thesis has only described the outcomes. But future research is needed on comparing input factors with planning outputs and then damage outcomes. The outcome of disaster planning, such as economic factors, the media, the nature of community outreach activities, and rural emergency preparedness organizational structure and what factors are requisite to better outcomes. Taken together, there are many activities underway pointing to an

integrated people-oriented, efficient approach to future disaster. The practical side of disaster research is showing improvement. It would be useful to continue tracking disaster planning in Benton County so others may learn from its experiences.

BIBLIOGRAPHY

Alexander, Ernest R. 1986. *Approaches to Planning*. New York: Gordon and Breach Science Publishers.

Allison, Graham. 1971. *Essence of Decision: Explaining the Cuban Missile Crisis*. Boston: Little, Brown.

Ary, Donald, Lucy Cheser Jacobs, Asghar Rasavieh. 1990. 4th ed. *Introduction to Research in Education*. Fort Worth, TX: Harcourt Brace Jovanovich.

Beebe, James. 1995. "Basic Concepts and Techniques for Rapid Appraisal," *Human Organization*, 54 (1): 42-51.

Bolstridge, June C. 1992. *EPCRA Data on Chemical Releases, Inventories, and Emergency Planning*. New York: Van Nostrand Reinhold.

Burby, Raymond J., and Linda C. Dalton. 1994. "Plans Can Matter!" *Public Administrative Review*, 54 (3), May/June: 229-238.

Burton, Ian, R.W. Kates, G.F. White. 1993. Second edition. *The Environment as Hazard*. New York: The Guilford Press.

Clary, Bruce. 1985. "The Evolution and Structure of Natural Hazard Policies," *Public Adminstration Review*, Special Issue: 20-27.

Department of Emergency Services. 1984. *Benton County Hazard Analysis*.

Department of Emergency Services. 1994. *Benton County Hazard Analysis*.

Dynes, Russell. 1970. *Organized Behavior in Disaster*. Lexington, MA: Heath Lexington Books.

Dynes, Russell. 1990. "Community Emergency Planning: False Assumptions and Inappropriate Analogies, Preliminary Paper No. 145, Disaster Research Center, Newark: University of Delaware.

Ebert, Charles H.V. 1988. *Disasters: Violence of Nature and Threats by Man.* Dubuque, Iowa: Kendall/Hunt.

Eisenhardt, Kathleen M. 1989. "Building theories from Case Study research." *Academy of Management Review*, 14 (4).

Etzioni, Amitai. 1965. "Dual Leadership in Complex Organizations." *American Sociological Review*, 30 (5).

Federal Emergency Management Agency. August 5, 1986. *Flood Insurance Study of Benton County, Oregon, unincorporated areas.* Community Number 410008.

Federal Emergency Management Agency. 1992. *Federal Response Plan.*(Public Law 93-288, as amended.).

Federal Emergency Management Agency. 1990. *Guide for the Development of State and Local Emergency Operations Plans*, CPG 1-8.

Federal Emergency Management Agency, Region X Office. 1994. *Community-Based Emergency Preparedness* Documents.

Filley, Alan C. and Robert House. 1969. *Managerial Porcesses and Organizational Behavior.* Glenview, IL: Scott, Foresman.

Fischhoff, Baruch, Paul Slovic, Sarach Lichtenstein, S. Read, and B. Combs. 1980. "How Safe is Safe Enough?" *Policy Sciences*, 8: 127-152.

Fitchen, Janet M. 1990. "How do you know what to ask if you haven't listened first?" *The Rural Sociologist*, Spring: 15-22.

Foster, Harold D. 1980. *Disaster Planning: The Preservation of Life and Property.* New York: Springer-Verlag.

General Accounting Office. 1993. "Disaster Management, Recent Disasters Demonstrate the need to improve the Nation's Response Strategy. GAO/T-RCED-93-20.

Gerth, H., and C. Wright Mills. 1946. From Max Weber: Essays in Sociology. Oxford Press, Inc.

Goldfinger, Chris. 1990. "Evolution of the Corvallis Fault and Implications for the Oregon Coast Range," Master's Thesis. Corvallis: Oregon State University.

Graham, Hitchcock and David Hughes. 1991. *Research and the Teacher: A qualitative introduction to school-based research.* London: Routledge.

Griggs, Gary B., and J. Gilchrist. 1983. *Geologic Hazards, Resources, and Environmental Planning.* Second edition. Belmont, CA: Wadsworth.

Hadden, Susan G. 1989. *A Citizen's Right-to-Know.* Boulder, Colo.: Westview Press.

Hall, Richard H. 1991. 5th ed. *Organizations, Structures, Processes, and Outcomes.* Englewood Cliffs, NJ: Prentice Hall.

"Harper's Index," *Harper's Magazine*, April 1995: 13.

Herken, Gregg. 1987. *Counsels of War.* Expanded edition. New York: Oxford University Press.

Hewitt, Kenneth. 1983. *Interpretations of Calamity from the viewpoint of Human Ecology.* London: Allen and Unwin, Inc.

Hewitt, Kenneth and Ian Burton. 1971. *The Hazardousness of a Place. A regional ecology of damaging events.* University of Toronto Press.

Hitchcock, Graham and David Hughes. 1991. *Research and the Teacher.* London: Routledge.

Kast, Fremont E., and James E. Rosenzweig. 1979. *Organization and Management: A Systems and Contingency Approach*. New York: McGraw-Hill Book Company.

Kates, R.W. 1978. *Risk Assessment and Environmental Hazard*. New York: Scope 8, Wiley and Sons.

Madin, Ian, George R. Priest, Matthew Mabey, Steve Malone, and Dan Meier. "Scotts Mills Earthquake - western Oregon's wake up call," *Oregon Geology*. 55 (3), May 1993: 51-58.

Malinowski, B. 1922. *Argonauts of the Western Pacific*, London: Routledge and Kegan Paul.

May, Peter J. 1985. "FEMA's Role in Emergency Management: Examining Recent Experience," *Public Administration Review*, Special Issue: 40-48.

May, Peter J., and Walter Williams. 1986. *Disaster Policy Implementation, Managing Programs under Shared Governance*. New York: Plenum Press.

McLoughlin, David. 1985. "A Framework for Integrated Emergency Management," *Public Administration Review*. Special Issue.

Mitchell, Bruce. 1989. *Geography and Resource Analysis*, 2nd edition, New York: Longman Scientific and Technical.

Monmonier, Mark. 1994. *Drawing the Line: Tales of Maps and Cartocontroversy*. New York: Holt and Company.

National Academy of Public Administration (NAPA). 1993. "Coping with Catastrophe: Building an Emergency Management System to meet people's needs in Natural and Man-made Disasters." Washington, D.C.: 1-138.

National Oceanic and Atmospheric Administration. 1991. "Sea, Lake and Overland Surges for Hurricanes," Pinellas County, FL.

Oregon Department of Environmental Quality. 1988. *Oregon Environmental Atlas.* Portland State University.

Oregon Department of Forestry, Draft Administrative Rules for Wildfire Hazard Zones, 629-47-010, Jan. 10, 1994.

Oregon Revised Statutes, "Regulation of certain structures vulnerable to earthquakes, 1991 ed., Title 36, Building code 455.447.

Oregon Revised Statutes, "Emergency Management," Chapter 401 series, 1993 series.

Oregon Seismic Safety Policy Advisory Commission. "Actions to Address Earthquak Risk in Oregon," 1992. *Report to the Governor and Legislative Assembly for 1991-1993.*

Oregon State Fire Marshal's Handbook on Hazardous Materials, 1993.

Oregon State Health Division. March 31, 1994. "Listing of Radiological Licensees in Benton County."

Orum, Anthony, J.R. Feagin, and G. Sjoberg (ed.). 1991. "The Nature of the Case Study." A Case for the Case Study. Chapel Hill: University of North Carolina Press.

Palm, Risa I. 1990. *Natural Hazards: An Integrative Framework for Research and Planning.* Baltimore: Johns Hopkins University Press.

Perry, Ronald W. 1985. *Comprehensive Emergency Management.* Greenwich, CT: JAI Press.

Petak, William J. 1985. "Emergency Management: A Challenge for Public Administration," *Public Administration Review.* Special issue.

Petak, William J., A.A. Atkisson, and P.H. Gleye. 1978. *Natural Hazards: A Public Policy Assessment.* Redondo Beach, Calif.: J.H. Wiggins Company.

Pugh, Derek S., D.J. Hickson, C.R. Hinings, and C. Turner. 1968. "Dimensions of Organizational Structure," *Administrative Science* Quarterly, 13 (1).

Quarantelli, E.L. 1985. "The Need for Planning, Training, and Policy of Emergency Preparedness, Preliminary Paper No. 101, *Disaster Research Center*. Newark, DL: University of Delaware.

Quarantelli, E.L. 1988. "Local Emergency Management Agencies (LEMAs): Research findings on their progress and problems in the last two decades," Preliminary Paper No. 126, *Disaster Research Center*. Newark, DL: University of Delaware.

Rosenfeld, Charles L. 1994. "The Geographical Dimensions of Natural Disasters," *International Geographical Union*. Bulletin 44: 5-11.

Rossi, Peter H., J.D. Wright, and Weber-Burdin, E. 1982. *Natural Hazards and Public Choice*. New York: Academic Press.

Rubin, Claire and Roy Popkin. 1990. "Disaster Recovery After Hurricane Hugo in South Carolina," Working Paper No. 69, *Natural Hazards Research and Applications Information Center, Institute of Behaviorial Science*. Boulder: University of Colorado.

Schneider, Saundra K. 1992. "Governmental Response to Disasters: The Conflict between Bureaucratic Procedures and Emergent Norms," *Public Administrative Review*, March/April, 52 (5): 135-145.

Schneider, W.J. and J.E. Goddard. 1974. "Extent and Development of Urban Floodplains," *U.S. Geological Survey Circular* 601-J.

Schuman, David and Dick W. Olufs III. 1993. 2nd ed. *Public Administration in the United States*. Lexington, MA: D.C. Heath and Company.

Schwartzman, Helen B. 1993. "Ethnography in Organizations," *Qualitative Research Methods Series*, Vol. 27, Newbury Park, CA: Sage Publications.

Scott, Gregory M., and Stephen M. Garison. 1955. *The Political Science Student Writer's Manual.* Englewood Cliffs, NJ: Prentice Hall.

Selznick, P. 1949. *TVA and the grassroots: A study of politics and organization.* Berkeley: University of California press.

Settle, Allen K. 1985. "Financing Disaster Mitigation, Preparedness, Response and Recovery," *Public Administrative Review.*

Shafritz, Jay M., and J. Steven Ott. 1992. 3rd ed. *Classics of Organization Theory.* Belmont, CA: Wadsworth Publishing Company.

Slovic, Paul. 1987. "Perceptions of Risk," *Science*, 23: 280-285.

Smith, Keith. 1992. *Environmental Hazards: Assessing risk and reducing disaster.* London: Routledge.

Spradley, J. 1970. *You owe yourself a drunk.* Boston: Little, Brown.

Star, Jeffrey and John Estes. 1990. *Geographic Information Systems: An Introduction.* Englewood Cliffs, NJ: Prentice-Hall, Inc.

Sylves, Richard T. 1994. "Ferment at FEMA: Reforming Emergency Management," *Public Administrative Review*, May/June, 54 (3): 303-307.

U.S. Geological Survey.1955. "Geology of the Marys Peak and Alsea Quadrangles, Oregon. *Oil and Gas Investigations*, Map OM 162.

U.S. Geological Survey. 1979. *Geologic Hazards of Eastern Benton County.* Bulletin 98. Portland: Oregon Department of Geology and Mineral Industries (DOGAMI).

U.S. House of Representatives, *Report of the Bi-partisan Task Force on Disasters*, Dec. 14, 1994.

U.S. Statutes at Large. 1977. "Earthquake Hazards Reduction Act of 1977," (P.L. 95-124.), 95th Congress.

U.S. Statutes at Large. 1988. "Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974," (Public Law 93-288). 93rd Congress, later amended in 1988 (P.L. 100-707).

Waddell, Eric. 1977. "The Hazards of scientism: a review article." *Human Ecology*, 5 (1): 69-76.

Waugh, William Jr. 1994. "Regionalizing Emergency Management: Counties as State and Local Government," *Public Administration Review*, 54 (3): 253-58.

White, Gilbert. 1961. "The Choice of Use in Resource Management," *Natural Resources Journal*: 23-40.

Whyte, William F. 1943. "Streetcorner Society: The social structure of an Italian slum." Chicago: University of Chicago Press.

Whyte, William F. 1987. *Learning from the Field*. Newbury Park, CA: Sage.

Yin, Robert. 1989. "Case study research: designing and methods," *Applied Sociological research methods*, Series vol. 5, Sage Publications, Inc.

Yin, Robert 1993. "Applications of Case Study Research," *Applied Sociological research methods*, Series vol. 34, Sage Publications, Inc.

APPENDICES

APPENDIX A

Benton County Emergency Services Management Council

Vision Statement

The Benton County Emergency Services Management Council and the citizens of the mid-Willamette Valley celebrate our outstanding success in planning and preparing for natural and (hu)man-made disasters. The concept of "our" problem, "our" plan, "our" solution has fostered a sense of community and cooperation that serves as a model to other areas of public policy formulation

The issue of emergency response is viewed as a total system that recognizes the inter-relationship and importance of each and every part. All decisions and actions are on behalf of the citizens and their needs with no regard for political or jurisdictional boundaries. This systems approach to planning ensures an integrated response to emergency events which maximizes the effectiveness of the combined public and private resources. Clear concise lines of authority have been established in our plans to cover all known threats; our numerous drills and exercises have tested these relationships and they have proven extremely effective.

The success of our program is directly attributable to the solid financial support we have received from a number of sources. Federal, state, and local governments have recognized the magnitude of the growing threat of hazardous materials and other (hu)man-made disasters in our communities, as well as the continuing danger posed by natural hazards. This growing awareness has been translated into significant investment in emergency services/public safety infrastructure and readiness. Oregon State University and private industry are also full partners in our campaign. OSU and local businesses, both large and small, have taken active role sin all aspects of emergency preparedness, generously supporting the program with either monetary grants, facilities, services, and/or professional expertise.

The key to our preparedness is an aggressive 72-hour family preparedness program that provides instruction to all segments of our society from pre-schoolers to senior citizens. The cornerstone of

APPENDIX A (CONTINUED)

the program is active public participation through established neighborhood groups, with neighbors helping neighbors. Citizens are repeatedly reminded of the importance of preparedness and self-reliance through awareness education presentations in the schools, professional and social groups, employee training and through media public service announcements. Significant effort has also been given to preparing the families of our emergency responders so that these trained professionals can focus on their job with the knowledge that their loved ones are secure in a time of crisis.

Community preparedness is richly enhanced by the highly motivated, well-trained personnel in our response agencies. In every case their training surpasses the state accreditation standard. The responders regularly exercise their capabilities through formal and informal events; the exercises involve volunteers, local citizens, as well as state and federal agencies. Mutual aid agreements exist as only a formal reminder of our inter-reliance and commitment to mutual cooperation and success.

APPENDIX B:

Chronology of Interviews and Participant Observations

Dates	Interviews	Participant Observations
April 7	Benton Co. Emergency Services Coordinator	
April 13-15		Statewide Exercise: Quake-X '94
April 22		Benton Co. Commissioner's meeting
April 26		Earthquake Preparedness Seminar (O.S.U.)
April 27	Benton Co. Emergency Services Coordinator	
May 16-20		FEMA Professional Development Series Disaster Planning Course (Salem)
May 18		Benton Co. Emergency Management Council meeting
May 24	O.S.U. researcher, Coastal Hazards	
June 8	Benton Co. Emergency Services Coordinator	
July 7	Benton Co. Emergency Services Coordinator	
July 8	Benton Co. Citizen Activist in Emergency Preparedness	
July 20	O.S.U. Extension Agent, Emergency Preparedness and Public Education	Benton Co. Emergency Management Council education subcommittee meeting
Aug. 6		Benton Co. Fair, Emergency Services Booth
Aug. 11	Benton Co. Emergency Services Coordinator	
Aug. 24		Benton Co. Emergency Management Council meeting
Aug. 29-31	Keynote speaker, James Lee Witt, Director of FEMA	Oregon Emergency Management's Annual Meeting (Bend)
Sept. 1	Benton Co. Sheriff	
Sept. 6	FEMA Region X State and Local Assistance Program Representative, Bothell, Wash.	
Sept. 8	Benton Co. Emergency Services Coordinator	
Sept. 15		Benton Co. Emergency Management Council education subcommittee meeting

APPENDIX B (CONTINUED)

Date	Interviews	Participant Observations
Oct. 4	Benton Co. Citizen Activist in Emergency Preparedness	Tsunami hazard warning off Oregon Coast (Oregon Emergency Management Agency)
Oct. 6	Benton Co. Fire Marshall, Hazardous Waste site locations	
Oct. 6	Philomath Rural Fire Protection District, Fire Marshall	
Oct. 10	Benton Co. Public Works, systems engineer	
Oct. 12	O.S.U. professor, Geology	
Oct. 13	O.S.U. professor, Geography	
Oct. 19		Benton Co. Emergency Management Council meeting
Oct. 24	Corvallis Fire Dept. official	
Oct. 26	Benton Co. Emergency Services Coordinator (about FEMA Region X Mitigation Forum, Seattle)	
Nov. 12		Tour, Corvallis Sewage Treatment Plant
Nov. 14	O.S.U. professor, structural engineering	
Nov. 16	FEMA Region X State and Local Governments representative (Corvallis)	Benton Co. Emergency Management Council Meeting
Nov. 17	FEMA Region X State and Local Governments representative (Corvallis)	O.S.U. Panel Discussion, "Government Facing Disaster"
Nov. 28	Oregon State Dept. of Forestry, Fire Protection representative	
Dec. 17		Evaluation of Exercise: "Violence in the Workplace"
Jan. 5	FEMA Region X, State and Local Governments Representative, Bothell, Wash.	
Jan 12-15		Benton Co. Emergency Services and Public Works response to flooding
Jan. 18		Benton Co. Emergency Management Council Meeting
Jan. 18	Benton Co. Emergency Services Coordinator	
Feb. 6	Oregon Emergency Management Agency's Quarterly Meeting (Insurance Reform)	

APPENDIX B (CONTINUED)

Dates	Interviews	Participant Observations
Feb. 24	Benton Co. Emergency Services Coordinator	
March 7	FEMA Region X, State and Local Governments Represenative, Bothell, Wash.	
March 15		Benton Co. Emergency Management Council meeting; Guest presentation made by author
March 20	Benton Co. Emergency Services Coordinator	
March 23	OEM Population Protection Planner	
March 30	Benton County Sheriff	
March 30	Key Informant	Benton County Emergency Management Council Education Subcommittee Meeting
March 31	Benton Co. Emergency Services Coordinator	
April 3	Utilities Spokesperson, Albany	
April 4	OSU Radiation Safety Office spokesperson	
April 5		Benton Co. Emergency Management Council sponsored Kobe Earthquake Presentation at OSU
April 10		Benton Co. Emergency Management Council sponsored Earthquake Preparedness Seminar
April 11	FEMA Region X, State and Local Governments Represenative, OSU	
April 20		Benton Co. Emergency Management Council sponsored Earthquake Preparedness Seminar

APPENDIX C

Sources of Data Collection for Benton Co. Case Study

Characteristics	Semi-Structured Interviews	Documents	Participant Observations
Organizational Structure	•Benton Co. Emergency Services (Sheriff and Coordinator) •City of Corvallis and Philomath Rural Fire Protection District officials •American Red Cross officials •Oregon Emergency Management Agency (Population Planner) •FEMA Region X (State and Local Assistance representative)	•Reviewed plans from other states (California, Florida, Tennessee, Washington, and Hawaii) •Reviewed plans from other counties in Oregon(Umatilla, Klamath, Deschutes, Baker and Lane) •FEMA's Civil Preparedness Guides for State and Local Government •FEMA's Federal Response Plan •Professional journal articles	•Benton Co. Emergency Management Council bi-monthly meetings •County Commissioners meetings (budgeting, planning, and debriefing) •Drills (e.g., Quake-X '94, Violence in the Workplace) •Panel Discussion: "Government Facing Disaster"
Problem Identification	•Benton Co. Emergency Services (Sheriff and Coordinator) •American Red Cross officials •Oregon Emergency Management Agency (Population Planner) •FEMA Region X (State and Local Assistance representatives	•Drafts of revised plans •Newspaper articles	•Benton Co. Emergency Management Council bi-monthly meetings •Drills (e.g., Quake-X '94, Violence in the Workplace)

APPENDIX C (CONTINUED)

Characteristics	Semi-Structured Interviews	Documents	Participant Observations
Leadership Approach	•Benton Co. Emergency Services (Coordinator)	•Books •Professional journal articles •Memos	•Benton Co. Emergency Management Council bi-monthly meetings •Oregon Emergency Management Agency's Annual Meeting for County Emergency Planners (Keynote speaker--Director FEMA) •Panel Discussion: "Government Facing Disaster"
Citizen Involvement	•Benton Co. Emergency Management Council Chair •Benton Co. residents and private businesses •Oregon State Extension staff	•"When Disaster Strikes" video •FEMA Region X Mitigation Forum transcripts •Mountainview Elementary School Disaster Education Pilot Project •Portland NET Program •Newspaper articles	•Benton Co. Fair Booth •Earthquake Seminar (1994-1995) •Corvallis Fire Dept. Open House

APPENDIX C (CONTINUED)

Characteristics	Semi-Structured Interviews	Documents	Participant Observations
Role of Experts	•Benton Co. Public Works (Engineering and Coordinator) •City of Corvallis and Philomath fire marshals •Good Samaritan Hospital officials •Professors and graduate students at OSU •Employees at various state agencies (Building Codes Agency; Dept. of Transportation; Dept. of Geology and Mineral Industries; Dept. of Forestry)	•1984 and 1994 Hazard Analyses for Benton County • Current source maps (USGS; Soil Conservation Service; FEMA Floodplain Maps; Dept. of Forestry) •DOGAMI and USGS publications (*Oregon Geology* and *Earthquakes and Volcanoes*)	•Public seminars and lectures discussing earthquakes, tsunamis, flooding, and forest fires •FEMA's Professional Development Series (PDS) Emergency Planning Courses
Outcome of Planning	•Planning committee (annex) chairs •Benton Co. Emergency Services (Coordinator) •Oregon Emergency Management Agency (Population Planner) •FEMA Region X (State and Local Assistance representative)	•Former civil defense plans •Drafts of revised plan •Oregon 401 Series (1993 legislature) •Stafford Act and amendments •Flow charts •Newspaper and journal articles	•Benton Co. Emergency Management Council bi-monthly meetings •FEMA Region X Mitigation Forum

APPENDIX D

Benton County Emergency Management Council Citizen Survey

Benton County is currently involved in updating and modernizing its plan for handling major emergencies. The Emergency Management Council (made up county and local services that would be involved during an emergency), is emphasizing family and neighborhood preparedness as the heart of its program. Studies show that 80% of those called on to deal with critical disaster situations -- at least in the first hours -- are citizens like yourselves. Government and professional services can neither meet all the needs, nor should individuals yield all responsibility for their own welfare. Governments must focus on the worst cases and those most central to the welfare of all. Citizens must take responsibility to prepare themselves and families. We must all work together for a safer, more prepared community.

Some communities have organized neighborhood groups around emergency preparedness, others use already existing neighborhood associations. Whatever arrangements, the Council is encouraging neighborhood preparedness and seeks to educate and coordinate with those willing to plan. The Council wants feedback on your interests and your opinions on how we might best organize to plan for an earthquake, fire, hazardous materials spill, flood, etc.

1. Do you think an existing organization in your neighborhood such as a home owners association or Neighborhood Watch would be willing to engage in emergency preparedness planning and training?
2. If no organization exists, do you think you neighborhood would be willing to engage in an emergency preparedness planning/training committee?
3. Would you be willing to help organize your neighborhood?
4. Other than neighborhoods, is there another way you would suggest to organize for emergency preparedness?

Thank you for your response. Please drop in a box as you exit the auditorium.

APPENDIX E

Transcript from *"When Disaster Strikes"* Video (Segment of Benton County)

In an actual disaster, protection is more than a government responsibility. It is up to us as individuals, families, and neighbors to know what we need to do to protect ourselves.

In Corvallis, Oregon, in a church meeting room, an unusual meeting of city and county agencies involved in emergency management is taking place. Unusual because the officials are being brought together by a Corvallis homemaker, (Key Informant).

(Key Informant): "As a mom, as a wife, and as a homemaker in this community, what is it that I need to know? What is it that I need to have? And so I look at you and all of your ideas and all of your programs and I say, 'help.'"

During the course of the two-hour meeting the participants share information and ideas about emergency preparedness, and come to two conclusions: The first, local families need more information on how to prepare for disasters, and survive on their own.

(Public safety official): "But the real principle focus that I am picking up on this is the public needs to know what is there for them. And they also need to know the fact there is a certain amount of self-help that needs to occur."

The second conclusion: It will take the active involvement of concerned citizens like (Key Informant) to get a community awareness program up and running. The group decides to create a community-wide task force on citizen preparedness, and they agree to meet again ....

APPENDIX F

June 17, 1995

Jim Swinyard
Benton County Emergency Services
Law Enforcement Building
Corvallis, Oregon 97330

Dear Mr. Swinyard,

I applaud your efforts with involving more of the community in disaster planning in Benton County. It was interesting for me to study the disaster planning process and emerging approach that yourself and the Benton County Emergency Management Council have been undertaking. Thank you for allowing me to read files, work plans, and planning manuals, and to observe meetings, drills, and training sessions. Likewise, I appreciate your time to discuss and verify information about Benton County's disaster preparedness program. From my research, I would make a few constructive recommendations for your community-based program.

As the county emergency services coordinator, you are aware that disaster planning is a complicated task. In the past, the public has been apathetic and has expected government to "bail them out" during disasters. Overcoming these obstacles and reaching out to the community is difficult, but necessary in order for the public, private, and volunteer groups to share the responsibility for disaster preparedness. Including volunteers in the planning process is difficult because they require additional training and are not held accountable to formal guidelines. Moreover, managing twenty-two functional planning committees has been hard because disaster planning responsibilities are added to their daily tasks. Overall, it has been cumbersome to solely oversee that individuals and groups (public, private, or volunteer) complete their sections of the plan.

If possible, I would suggest that you and the Council consider three recommendations. First, you could recruit people who have previously experienced a disaster to assist you with convincing others about the importance of disaster planning. In addition, they could motivate and educate others about disaster preparedness by sharing hardships and benefits from prior experiences.

APPENDIX F (CONTINUED)

The second recommendation is to look at how you and the Council work with volunteers in emergency management. Two advantages of broadening disaster preparedness to the community are an expanded resource base and improved response capabilities. However, there have been problems with group organization and decision-making when more people are involved. I would suggest that you and the Council continue to have diverse representation in the disaster planning process. There is a potential for a follow-up study by another student to find additional ways to make this effective.

Lastly, citizens may not be aware of the benefits with structural and non-structural mitigation efforts. For instance, during an April 11, 1995, meeting, Fire Chief Van Pelt noted that Benton County has lower incidents of structural fires in comparison to adjacent counties due to a 90-year-old building code requirement. I suggest that you and the Council consider looking at the benefits of mitigation efforts for all hazards in Benton County.

Again, our interviews were most helpful for gathering information about community-based emergency preparedness in Benton County. Best of luck with your programs and activities in the future, and please keep in touch.

Sincerely,
Redacted for privacy

Colleen Kinney
MAIS graduate student

cc: Benton County Emergency Management Council Chair; FEMA Region X State and Local Planner